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NEVADA STATE

MINERALOGIST'S REPORT

FOR THE YEARS 1867 AND 1868.

203816

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STATE MINERALOGIST

OF NEVADA

FOR

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NOTE.—Wherever the word "feet" occurs in the following Report, preceding the word "level," read "foot."

REPORT.

To the Honorable the Board of Regents of the State of Nevada—

Gentlemen: The mineral resources of Nevada have proved to be so extensive, and so productive of wealth, that they have deeply engaged public attention, attracted capital from abroad, and become the subject of important legislation. The law providing for the organization of a mining school as a part of the State University, and creating the office of State Mineralogist, was designed to encourage the development of all valuable mines. No provision however was made either for the payment of the salary of such an officer, or for defraying his traveling and other necessary expenses. To discharge the duties legally required of me as State Mineralogist, I have therefore economized as best as I could; have advanced my own funds at a heavy personal sacrifice; and have labored under many disadvantages.

EXPLORATIONS.

Soon after submitting my last report I arranged to be associated, early in the spring of the present year, with Mr. Clarence King, who was conducting a Geological Survey along the line of the Central Pacific Railroad. The division of the party with which I was connected did not enter the field for active operations, owing to the unusual backwardness of the season, until about the first of May; even then the grass had not grown sufficiently to sustain our animals, and we were compelled to purchase feed for them, for weeks afterwards. Through the kindness of Mr. King, I was enabled to forward to Austin, in the care of his men, a light spring-wagon, a double harness, and such other articles as I expected to need in my travels and investigations, after it became necessary for me to pursue my work alone.

Our company consisted of Mr. Henry Custar, topographical engineer; Mr. Sereno Watson, botanist; myself, as mineralogist; two muleteers and a cook.

My notes on the various subjects specified in the law as proper for the examination of the State Mineralogist, including an account of all the natural resources of the country, bear date from the day of starting. We passed through Washoe Valley, and down the Truckee River, exploring the mountains several miles north of the railroad to Wadsworth. The intervening arm of the desert was crossed to the southern extremity of the Trinity Mountains. This range was examined through its entire length several miles northwest of Oreana. From this point to the mountains east of the mouth of Reese River, a section of country was explored bounded on the north by the Humboldt River, and varying from fifty to a hundred miles in width. We ascended Reese River to Austin, where we met Mr. King, and the remaining divisions of his party, on the fourth of July. It was necessary for him to proceed from this point towards the north and east, in a section of the State so remote from the more prominent mining districts, that I could not at so late a period find time to accompany him. Mr. King's investigations are made with the greatest care and thoroughness, through personal observations, and through the labors of well qualified assistants; and the results will be highly beneficial to Nevada and to the country, and it is hoped that his report will be speedily published by the general Government.

From Austin I proceeded to White Pine District. As there was no road leading directly to Pahranagat, my journey through the intervening country was little else than an exploration. I was deeply impressed with the favorable mineral indications of several places, but found it impossible to explore them without assistance. Afterwards I called the attention of different parties of miners to these localities, and am happy to know with the most satisfactory results. Mines have been discovered, and at least two new districts organized. Specimens of ore which I have examined are rich in silver, and have traces of gold. In this journey I was entirely alone, except as I was surrounded by Indians. My team was so nearly exhausted, that I could do but little more than make a casual examination of the debris along the base of the foot-hills.

From Pahranagat I returned to Reveille, and afterwards visited all the intervening districts to Austin, including San Antonio. Further west I was at New Pass, Ione, Mammoth, Pine Grove, Washington, Aurora, and Virginia City. I regret that I was unable to visit the Cortez, Egan Cañon, and Silver Peak Districts. I procured such information respecting the mines in these localities as I could, from reliable sources, and have inserted it under the proper headings. The distance traveled during the season is something more than twenty-five hundred miles.

STATE MUSEUM.

Specimens of ore have been obtained from almost every mine visited. Thus far the collection would have been complete, had it not been for the loss of one or two boxes in transportation. I have also specimens of the various geological formations, including all the principal rocks of the districts through which I have traveled. All these are ready to be labeled, described, and arranged in a cabinet, as soon as a suitable room and casings are prepared.

The collections made by Professor R. H. Stretch, former State Mineralogist, were designed for the International Exposition held in Paris, in 1867. They were taken as far as San Francisco, but were not sent forward as originally intended. I have had them returned to Carson, and they will be an important addition to the collections made this season. As the foundation for a permanent Museum is now laid, it is hoped that it will have a healthful and rapid growth. Specimens of every variety of minerals and of all the natural products of the State should be procured.

STATE UNIVERSITY AND UNIVERSITY LANDS.

It will be seen from the eighth Section of the eleventh Article of the Constitution, that it is made the imperative duty of the Board of Regents of the contemplated State University, "from the interest accruing from the first funds which come under their control to immediately organize and maintain the said mining department, in such a manner as to make it most effective and useful: *provided*, that all the proceeds of the public lands donated by Act of Congress, approved July 2d, A.D. 1862, for a College for the benefit of agriculture, the mechanic arts, and including military tactics, shall be invested by the said Board of Regents in a separate fund, to be appropriated exclusively for the benefit of the first named departments to the University, as set forth in Section four" of said Article II, meaning agriculture and mechanic arts.

These aggregate provisions, though somewhat obscure, are to this effect, as I understand them, namely: That from the interest arising from the investment of the first principal coming into their control (unless that "first principal" be from the sale of lands granted by said Act of Congress of July 2d, 1862) the Board of Regents shall organize and maintain a mining department of the State University; and that the proceeds of the sale of lands granted by said Act of July 2d, 1862, whether they come into the control of the Board of Regents *first* or otherwise, *must* be by said Board invested in a separate fund, for the exclusive benefit of the departments of agriculture and the mechanic arts, in said University.

If I am correct in the foregoing construction, there is no fund at command, nor can there be any, without further legislation, from which the Board of Regents can draw to defray the expenses of erecting the necessary buildings for, and organizing and maintaining the contemplated and much to be desired mining school department of the State University: for the *only* funds, the investment of which has so far been given to said Board, are the proceeds of sales of land granted by Congress, July 2d, 1862, "for a College for the benefit of agriculture, the mechanic arts, and including military tactics." (See Section nineteen, page one hundred and seventy, Statutes of 1867.)

I therefore deem it proper to suggest, that the Legislature carefully examine the Act of 1866, in regard to a mining school; and the Act of 1867, in relation to the selection and sale of all lands granted by Congress to this State; and by new and amendatory Acts supply their defects, and provide means whereby the erection of buildings, and the organization of a mining school may be effected, as required by the eleventh Article of the Constitution.

TOPOGRAPHY OF NEVADA.

Nevada extends from the summit, along the eastern slope of the Sierras into the center of the great plateau eastward; and from forty or fifty miles south of El Dorado Cañon on the Colorado River, to the southern boundary of Oregon. The general altitude of this elevated region is about four thousand feet above tide water. It is traversed from north to south by high parallel ranges of mountains, separated by plains varying in width from ten to twenty miles. Near the base of the foothills of the Sierras, eastward for a distance of fifty or a hundred miles, there is a general depression continuing through almost the whole length of the State. This consists of a succession of smaller depressions or basins—the lower portions of which are covered with loose sand, and are nearly barren, or with bare alkali flats, small lakes, and the sinks of different streams. Low hills sometimes separate these smaller depressions; but usually they are connected by plains or narrow passes. There is but little regularity in their form, size, recurrence, or elevation. Those in the northern part of the State are perhaps longer and higher than those in the central portion. The basin including Mud Lake is not so large as that including Pyramid Lake; and this last is not so extensive as the basin where the Carson and Humboldt Rivers terminate. South of this, there is a low range of mountains towards Walker Lake; but near Fort Churchhill there is a pass, giving every evidence of once having been the channel of Walker River, which then flowed into the Carson, but now, a few miles further south, turns almost at right angles, and falls into a lake of its own. South of this lake the depressions take a more easterly direction, and by various windings open into Amargoza Valley. This valley runs in a southeasterly direction for a hundred miles or more; then gradually turns westward, and then north, until it connects with Death Valley, in California, one of the most remarkable depressions known. According to Col. Williamson it is one hundred and seventy-five feet below the sea level. (See "Report of Col. R. S. Williamson on the Geology of California, volume one; article: Death Valley. Published in 1868.")

whatever the changes of the climate may be, Nevada has ever been regarded as one of the healthiest countries in the world. There is no other place where men expose themselves so recklessly, and suffer so little from the consequences; the diseases incident to the country are yet to be determined.

LAKES.

Tahoe is situated on the Sierra Nevada Mountains, between the eastern and western summits, at an elevation of more than 6,000 feet. The line between this State and California divides this lake longitudinally about the center. It has been carefully sounded, and is found to be 1,350 feet in depth. The water is remarkably clear, cool, and free from all impurities. It is fed by a small stream from the south, but no doubt also by many large springs from beneath. It is distinguished for the abundance and excellence of its fish. There are three varieties of trout, one of which is very large, often weighing between twenty and thirty pounds. The surrounding scenery is always beautiful. The mountains are bold and rugged, their sides covered with dense pine forests, and their peaks with perpetual snow. This lake is a favorite resort in summer. It is about twenty miles in length, and from ten to twelve in width, with a pleasant sandy beach.

Washoe Lake in Washoe Valley, is but six or eight miles in length, and three or four in width. It is fed by springs from beneath, and has an outlet which unites with the Truckee River. The waters are alkaline.

Pyramid Lake is about thirty miles long, from ten to twelve wide, and has an elevation of about 4,000 feet. It is in the southwestern part of Humboldt County. A rock rises six hundred feet above the surface in the form of a pyramid, which fact gave name to the lake. The Truckee River pours its waters into it and connects it by this means with Lake Tahoe. It abounds in fine trout, and is surrounded by mountains which rise above it from 2,000 to 3,000 feet. A slough connects it with Winnemucca Lake, a few miles further east. This last mentioned lake is a broad, irregular basin, always shallow, often nearly dry. The Mud Lakes further north are very similar, and are frequently in the dry season bare alkali flats, extending over thousands of acres.

Walker Lake in Esmeralda County, is an irregular sheet of water, fed by Walker River. It is about twenty-five miles long, and from six to ten in width, has an elevation of about 4,200 feet, and is surrounded on the east, west and south by mountains. The water is fresh and clear, and it has large quantities of trout and other fish.

Carson Lake, in Churchill County, is somewhat oval shaped, about ten miles in diameter. The water contains large quantities of salt and alkaline matter. This lake is comparatively shallow, and in the midst of a desolate country.

Humboldt Lake is situated in the southern part of Humboldt County, and fed by the Humboldt river. It is about twenty-five miles in length and eight or ten in width. The water is very impure with alkali and salt.

The Sink of the Carson and Humboldt Rivers is a long shallow sheet of very brackish water, extending greatly in every direction during the rainy season, and contracting very much in the summer. It is connected with the Carson and the Humboldt Lakes by sloughs. Its altitude is barely 4,000 feet.

GAME.

Game of any value in Nevada is rapidly disappearing. A few mountain sheep are found along the loftier summits, and small flocks of Antelopes roam over the plains or feed among the hills. In the northern counties there are some Caraboo deer. The bear is seldom seen. The otter and the beaver are gone.

IMPROVEMENTS.

Material progress has been made in many parts of the State. New mineral districts have been organized, new mines of incalculable value discovered and opened, and others have been more thoroughly developed, but the *greatest* improvement of all, that which has infused new life and energy into every department, and which is rendering the varied resources of the country accessible and attractive, is the completion of the Central Pacific Railroad, nearly to the eastern boundary of the State. Along its line, towns and villages are springing up with incredible rapidity.

Already a demand is beginning to be felt for a cross section from some point east of the center of the State, by way of White Pine, Pahranagat and Calville, connecting with the line of navigation on the Colorado River, below El Dorado Cañon. Natural passes have been traced through most of the distance. Such an enterprise would develop all eastern and southern Nevada, overcome the difficulties of deserts and mountains, quicken the progress of the country and render it permanent.

AGGREGATE AMOUNT OF BULLION SHIPPED.

[The returns are not complete.]

By Wells, Fargo & Co., for		
1st quarter	$2,494,352	00
2d "	3,951.617	00
3d "	4,391,380	00
For October	1,265,924	00
	$12,103,273	00
By the Pacific Union Express, returns to Dec. 31, only from Virginia City	722,261	19
Total	$12,825,534	19

The deficit in this table may be approximately supplied. Estimating the shipments made by Wells, Fargo & Co. in October, as an average, the amount shipped in November and December was probably $2,531,848. It is supposed that the shipments made from eastern Nevada by the Pacific Union Express, and from various districts by private parties, are ample to make an aggregate for the year of at least $16.000,000. Every effort was made to have these returns complete, and is regretted that they are not. It appears from reliable authority that since the discovery of the mines, Nevada has added $100,000,000 to the wealth of the world.

GEOLOGY.

There is a vast field for investigation and study in this department. Volcanic or eruptive rocks prevail in some of their most difficult forms and peculiar combinations. They are spread over large sections of every mountain, and no doubt constitute the solid substance of every important range in the State. There are sedimentary formations of great extent; but they are often metamorphosed and almost always so tilted and broken, that the character of the older rocks beneath is manifest.

It would be a work of the deepest interest to trace out and determine the different order of the rocks, which really affect, more completely than anything else, every interest of the country. They form the walls and mould the veins of the gold and of the silver. They underlie the plains, constitute the architecture of the mountains, rear the precipices, and crop out over the highest peaks. They give form and grandeur to the landscape, and by disintegration compose the soils of the valleys, cover the plains with sand, with fields of alkali, and with beds of salt. They should be carefully described, and the position of each accurately mapped. But this would be a work demanding years of toil and a large expenditure of means.

Nothing further is attempted in this report than to mention the different leading geological formations of the sections of the State which I have hastily examined. That some of the technical terms, used from necessity, may be as clearly understood as possible, I subjoin a few definitions and descriptions taken from a paper of F. Baron Richthofen, and published in 1867 by the California Academy of Sciences.

RHYOLITE.

"The word 'rhyolite' is designed to express one of the prominent features of these rocks. It is this: that their chief varieties have the appearance, as it were, of natural glasses, and bear evidence more than any other rocks do to the unpractised eye of having been flowing in a viscous state. * * *

"*Mineral Composition.*—Rhyolite may be concisely defined as trachyte with an addition of silica, not chemically combined, and which is either segregated into crystals of quartz, or dissolved in the rock, and then no longer recognizable to the eye. It is, owing to the high proportion of silica entering into its composition, the representative of granite among volcanic rocks. Chemically it is its complete counterpart as far as ascertained by analysis, and even in outward appearance certain varieties of rhyolite offer at first sight a striking similarity with granite, though closer observation will at once reveal well marked differences between both. Rhyolite outrivals any other rock in respect to the truly astonishing number of its varieties, which are chiefly occasioned by modifications of texture. It consists in general of a paste, with or without minerals inclosed.

"The paste chiefly is liable to variations. Its colors are, white, gray, yellow, green, red, brown, which occur in all manner of shades; light ones prevail, while perfect black has not been met with—the texture is as varied as the color."

This rock appears in many places in the western part of Nevada, but it abounds most in the central and southeastern portions of the State. It has been traced at intervals from a few miles south of Gold Run District, a little way north of Austin, nearly to White Pine, where it changes due south to Reveille. It appears again north of Pahranagat, encircles that district, and overlaps many mountain ranges towards the Colorado River.

TRACHYTE.

Richthofen says: "Trachyte is only inferior to rhyolite in the number of its varieties, yet its chemical composition is as simple as that of the latter, and ranges within as definite limits. The rock appears to contain, on an average, from sixty to sixty-five per cent. of silica, and in this respect, as well as others, next alluded to rhyolite, the difference between the rocks belonging to both orders, having its fundamental cause in the chemical composition, manifests itself externally in certain differences of character, among which may be mentioned the absence of quartz among the essential ingredients of trachytic rocks, which probably contain no free silica at all; the usual predominance in them of oligoclase over sanidin; the larger proportion in which honrnblende participates in their mineral composition, and the fact of their specific gravity exceeding that of rhyolite. Like almost all volcanic rocks, trachyte consists of paste in which are imbedded various chrystallized minerals. This paste is of various colors, and has usually a more or less vesicular texture, which by its property of imparting to the rock a certain roughness of touch gave origin to the name. Chief in order among the inclosed minerals are sanidin, oligoclase, mica, and hornblende. They vary considerably as regards their relative proportion, and therefrom arises a number of varieties which have been partly distinguished by separate names. More numerous varieties, however, are occasioned by differences of texture."

Trachyte is found extensively in the Trinity Mountains. In one place it is beautifully columnar. This is a very unusual form for it to assume. This rock occurs occasionally in other parts of the State, especially east of Virginia City, along the hills, but not to the extent in which rhyolite is found.

PROPYLITE.

The author before quoted remarks of this rock that: "The most common varieties consist of a fine grained micro-crystalline paste, of dark green or greenish brown, more rarely of reddish and dark gray colors, in which are imbedded crystals of oligoclase and hornblende; the former is of whitish or light green color; the latter ordinarily dark green and fibrous, seldom black, with bright cleavage planes (as is the case with gamsigradite). The paste appears to be a fine grained aggregation of the same two minerals, (the feldspathic ingredient prevailing) with the admixture of titanic iron, and to owe its ordinary green color to the profuse dissemination of small particles of green fibrous hornblende. Sporadic crystals of augite are occasionally met with in some of the common varieties, while others contain rounded grains of quartz sparsely inclosed."

Propylite predominates in some sections of the State. It is found in several places between the East and West Walker Rivers on the road to Aurora, but is known most familiarly as the country rock, immediately east of the Comstock Lode in Storey County.

ANDESITE.

I need only state the substance of a remark of Richthofen that this rock "is always of a dark color, mostly blackish, though frequently reddish brown on the weathered surface." One variety, he says, is composed of "A paste of bluish black to dark gray color, of microcrystalline texture, which passes by gradual steps into that of obsidian. In the former case it is frequently vesicular, like trachyte. There are imbedded in it small but distinct tabular crystals of oligoclase, fine grains of titanic iron, small, elongated columns of hornblende, sometimes mica, and in most varieties a few isolated crystals or rounded grains of augite. Frequently these different crystals are so small as to be no longer recognizable except by the aid of the microscope. The rock is then similar in character to certain varieties of melaphyr, but may be distinguished by its vesicular texture, which is scarcely ever wanting in the hornblendic varieties."

In other varieties of andesite the "paste is of an oil-brown color passing into black, and has a compact appearance, and ordinarily a microcrystalline texture which passes into that of porcelain."

BASALT.

"Augite, labrador, and titanic iron, imbedded in a paste consisting essentially of the same minerals, constitute generally the rocks of this order, or labrador may be replaced by lencite, nepheline, or a zeolitic substance, or other minerals may enter into the composition, such as olivine, basaltic hornblende, hauyone, apatite and black mica; and in many instances basaltic rocks consist merely of a fine grained aggregation of the different minerals mentioned. Ordinarily, the paste has a microcrystalline texture, and may either contain crystalized minerals imbedded, or may be devoid of them." * * * "Among the peculiarities of these rocks, and which may also in some measure be observed with augitic audesite, is the occurrence of rounded cavities filling the rock and giving it a cellular, sometimes spongy appearance."

Basalt is found in almost every part of the country. It constitutes long table-like sections of the Dun Glen Mountains east and northeast of Unionville.

CHLORITE SCHIST.

This is a slaty rock, of an olive green color, often having a dark reddish cast when exposed to the weather. It contains chlorite-iron, alumina, silica, and magnesia, and is found about the mines in Egan Cañon, San Antonio and other places.

It is hoped that these definitions and descriptions will enable every reader of this report to form an intelligent idea of the rocks to which the terms are applied.

ESTIMATES OF THE VALUE OF ORES AND MINES.

In stating the value of ores much care has been exercised to obtain a true estimate. Sometimes assays have been relied upon, where there were no mills, and where the ore has not been reduced. In many instances where it was possible, the real working value is given. Where small quantities or a few tons have been reduced, an over estimate of the mine may be made from the results. This depends upon the selection of the ore. If the highest grade only is worked, of course the yield will be above the average.

As it has been impossible for me to make selections in any case, my statements may not always give a correct estimate of the real value of the mines. It might be well to consider the products given as something above the average yield. Of course these remarks pertain only to mines but partially developed. Those which have been worked for years have proved their value, and have an established character.

OUTFIT.

The explorations necessary to be made, and the character of the work to be done, demanded an appropriate outfit. To study the geological formations of a country, to determine its mineralogical character, and to ascertain its agricultural capacity correctly, it must be seen, explored and patiently examined. This can not be done without a conveyance ever ready at hand. Accordingly I purchased early in the spring a light spring wagon, a double harness, and a span of small mules, which I could either ride, work or pack, as occasion might demand. The travel and hardships were so exhausting, that at Pahranagat I found one of the mules worn out, and unfit for service without being rested and recruited. I exchanged it for another and was not delayed.

For the want of means to procure appropriate instruments I have not had their use, except that of a barometer during the time I was connected with Mr. King's party, and hence absolute accuracy is not claimed in many deeply interesting and important calculations. This circumstance has thrown a doubt over some of the results of my labors, greatly mortifying, and I can only hope that the fact that the State has not been able during the term of my office to pay any part of either my salary or necessary expenses, and my own limited resources, may be some apology for the defect.

EXPENDITURES.

For outfit, (currency)	$635 58
Travelling expenses, (currency)	763 43
Freight on Specimens, (currency)	146 23
Total, (in currency)	$1545 24

The mules, harness and wagon are still on hand.

TERRITORY TO BE EXPLORED.

Nearly the whole of Lincoln county, a section at least a hundred miles in width along the eastern boundary of the State, with most of the northern portions of Lander and Humboldt counties—in fact, nearly the entire region north of the line of the Central Pacific Railroad, needs a careful and thorough mineralogical examination. Such a work would require much labor and self-sacrifice, and be of great permanent benefit to the State.

GENERAL REMARKS.

In the list of mines described it is not intended to include all which have been located, but only those claims upon which labor and money have been expended.

There can be no doubt that many mines now located but totally undeveloped may in a short time prove to be of the highest value.

No description has been attempted of even a considerable number of mills in the various districts. It may be sufficient to say upon this point that the whole number in each county, the number of stamps and their cost, is in the aggregate as follows, viz:

Counties.	No. of Mills.	No. of Stamps	Cost.
Ormsby	8	175	$450,000
Washoe	10	281	1410,000
Storey	36	655	2575,000
Humboldt	9	69	320,000
Lander	23	289	1645,000
Nye	11	121	686,500
Lincoln	2	20	200,000
Churchill	4	40	300,000
Lyon	41	543	1367,600
Douglas			
Esmeralda	14	160	490,000
Total	158	2363	$9,444,100

This table is not perfectly accurate. Since the statistics were collected several mills have been taken down in various parts of the State. Some have been reconstructed in White Pine, while others are on the way thither, and to other newly discovered districts.

Upon the whole it is as nearly correct as can be made in a country of such sudden and extreme changes.

It is the design of this report to present facts only, so far as it is possible to obtain them. Speculations are avoided.

Hoping that the results may be in a measure satisfactory, and tend somewhat to disseminate a correct knowledge of the material wealth of Nevada, a State whose peculiar resources are hardly explored, not thoroughly understood, and scarcely known to the world,

I am, yours obediently,

A. F. WHITE,
State Mineralogist.

MINES AND OTHER RESOURCES OF EACH COUNTY.

ORMSBY COUNTY.

There are no mines worked in this county. Discoveries were once made, districts organized, claims located, and small quanties of ore reduced; but there were no developments of permanent value.

The eastern portion of the county is covered by a section of the Pine Nut range of mountains, which formerly yielded a large supply of fuel, but the wood has been mostly cut away, and the hills are nearly bare. In the northern part of the mountains, near the county line, copper and iron ores have been found in large quantities. In Eldorado Cañon a bed of lignite was worked for a time for coal, but has been abandoned. A large quarry of lime-stone of good quality is opened a few miles south-east of Empire City.

These mountains present a variety of geological formations, among the most prominent of which are basalt, trachyte and transition slate.

The Carson River affords an almost unlimited water power, and a number of valuable quartz and saw mills have been erected along this stream. A quarry of sand-stone especially valuable for building purposes has been obtained as the site of the State Prison. It is a sedamentary formation, somewhat stratified and varying in compactness. It works easily, wears well, and has furnished material for the construction of the mint, and many other buildings. Three or four miles south-west from this quarry the same kind of rock crops out on the foot-hills of the Sierras in great masses.

In Eagle Valley there are many fine farms, gardens and hay ranches. The soil is warm, moist and productive.

The western part of the county is overlapped by a portion of the eastern slope of the Sierras ; and is covered with a forest of fine pine timber nearly to the base of the foot-hills. This mountain, including its spurs, and the low hills immediately north of Carson City, is chiefly composed of coarse-grained granite. Metamorphic slates appear in places and a hard glassy quartz crops out occasionally. At one period there was much excitement about the gold thought to be contained in this quartz, and which showed in careful assays, but no mines have been opened.

There are two large springs of warm water, one flowing from a crevice in the sand-stone near the State Prison, and the other rising in the valley about a mile and a half northeast of Carson City. They have a temperature of about 150 degrees.

Carson City, the capital of the State and the county seat, is situated in Eagle Valley and has a population of 1500. The Presbyterians, Methodists, Episcopalians and Catholics all have neat, comfortable houses of worship. There are good schools both public and private. There is a fine Court House, Masonic and Odd Fellows' Hall, and other public buildings. The United States Mint is rapidly approaching completion, and is a fine, substantial stone edifice.

Empire City is situated three miles north-east of Carson on the river; has about six or seven hundred inhabitants, a public school, and is within the vicinity of several very fine quartz mills; one of the best saw mills in the State is near this place.

According to the official returns the popular vote of Ormsby county is nine hundred and nineteen.

WASHOE COUNTY.

Washoe Valley and the Truckee Meadows combine to make this one of the best agricultural counties in the State. Well tilled farms, comfortable residences and accompanying improvements give it the appearance of an old settled country. Quantities of wheat, barley, rye, oats, corn, and hay and of all the hardier vegetables, are produced annually. The eastern slope of the Sierras covers a large portion of the western part of the county with a forest of fine timber.

Now that the Central Pacific Railroad is completed far into the interior, and that important improvements of every character are rapidly progressing, this timber is becoming of great value. Already the lumber trade is one of the leading moneyed interests of the county. The fact that the natural pass for the railroad is along the windings of the Truckee river, and that that stream affords an inexhaustible supply of water for machinery, greatly facilitate this business.

According to the official returns the popular vote of the county is 1494.

Washoe City, the county seat, is pleasantly situated at the north end of Washoe Valley. It contains about six hundred inhabitants, a Methodist Church, a Public School, a good substantial brick Court House, and a Masonic and Odd Fellows' Hall. There are a number of fine quartz mills in the vicinity.

Ophir, three miles south of Washoe City, on the west side of the lake, has a population of about one hundred and fifty. There are several families and a Public School. The Ophir mill at this place cost over $500,000. The bridge across the lake is more than a mile in length and cost about $75,000.

Franktown, a mile south of Ophir, has about one hundred and fifty inhabitants. It is an old Mormon settlement.

Reno, situated on the Truckee river and line of the railroad, is a newly built village. It is not yet a year since the first lot was sold. It is pleasantly situated, and has a population of three or four hundred people and a public school.

Crystal Peak, also on the railroad and Truckee river in the western part of the county, has about two hundred inhabitants.

Verdi, a hamlet on the railroad, with about one hundred and fifty inhabitants.

Glendale, east of Reno three or four miles, is a plesant hamlet.

Wadsworth is on the railroad at the lower crossing of the Truckee. The place is new, and contains between six and seven hundred inhabitants.

The mountains west of Washoe Valley are little else than a granite wall. This rock enters largely into the construction of every spur and hill. Granitic sand is a prominent element of the soil in the valley. East of the lake granite prevails in the south end of the mountain. Slates and quartzite appear in the debris, and a little to the north, boulders of trachyte occur. Following the outlet of the lake north of Washoe City masses of conglomerate compose the bluff on either hand. Frequent geological changes are apparent, before reaching Steamboat Springs; but the granite prevails on the west, and metamorphic slate on the east. These springs are about four miles north of Washoe City, at the base of low granite hills, capped with dark basaltic rocks. They cover a space north-west and south-east for a mile or more in length, and perhaps three hundred yards in width. There is a deposit of rough gray silicious matter many feet thick, over the whole area, which, no doubt has been accumulating for ages. The water flows out in places through long narrow fissures; sometimes through round, smoothly worn apertures, and then again it collects in pools and is of every degree of temperature to 204 degrees. Gasses, steam and heated air, are constantly ejected, in some instances in great quantities, and with much force. The sudden discharge of these elements at short intervals, produces a sound resembling the noise of a steamboat; hence the name of the springs. Quantities of sulphuretted hydrogen gas are emitted and often pieces of pure sulphur are thrown out by the force of the water. The amount of the silicious matter deposited is greatest when the water has the highest temperature. Where the springs are constantly boiling a kind of bowl or basin is formed, rising above the common level of the rock ten or fifteen inches.

In an early day, four or five mining districts were organized in various parts of the county. In Peavine district there is an abundance of copper. The ore frequently shows free gold, and gives assays of silver. It occurs as oxides and carbonates of copper.

Lignite is found near Crystal Peak; it is interstratified with layers of coarse sandstone. It has not led to the discovery of real coal, nor does it exist in quantities sufficient to be worked with profit.

The Galena district, a few miles west of Washoe City, has produced some lead containing quantities of silver, but not sufficient to render the mines of great value.

The grading necessary for the construction of the railroad through the mountains along the river east of the Truckee Meadows, discloses for several miles various geological formations. The prevailing rocks are rhyolite and basalt. The former constitutes the base and lower strata of the hills nearly on a level with the river. It is covered with a massive flow of basalt; columnar in one or two places where it dips towards the south, but is nearly perpendicular. It is very compact, yet much broken, and covers the sides of the hills for miles with loose fragments. North and east of Clark's station the geological formation changes, and propylite becomes the prevailing rock. It crops out on the highest ridges and comprises the solid matter of the mountains in that neighborhood. It dips about forty-five degrees northeast. Its course is probably northwest and southeast.

The mountains are cut up very much with deep, sharp cañons, which, except immediately along the river, run nearly due east and west. The highest peaks have an altitude of about six thousand five hundred feet. Along the sides of the hills there is a scattered growth of juniper, and bunch grass is abundant.

STOREY COUNTY.

The territory embraced within the limits of this county is broken and barren. There is scarcely any fertile land, and but little timber. Were it not for the Truckee River forming part of the northern boundary, this county would be almost wholly destitute of living water. The juniper and bunch-grass, which originally grew upon the hills, have mostly disappeared.

Virginia City, situated on the eastern slope of Mount Davidson, has a population of about 9,000. It is the largest, the wealthiest and most important business point in the State, and is well supplied with schools. The Episcopalians, Methodists, Presbyterians and Catholics, all have neat houses of worship. There are many other fine buildings, consisting of the Court House, Masonic and Odd Fellows' Hall, banks, express offices, etc.; and a large number of the finest quartz mills in the State, are in this vicinity.

Gold Hill, immmediately south of Virginia City, and connected with it, is compactly built, has a public school, Odd Fellows' Hall and a bank. The Methodists, Episcopalians and Catholics have houses of worship. There are also a number of fine quartz mills; the population is about 4,000.

American City, nearly joining Gold Hill on the south, has a population of bout one hundred and fifty.

The popular vote of the county, according to the official returns, is 4,055.

The resources of Storey County have been and ever must be chiefly in the roducts of the mines. The history of the discovery of the mineral wealth in this egion in 1857, and of the location of the first quartz claim on the 22d of February ollowing, is so well known that it need not be repeated. The Comstock Lode as a universal notoriety. Its extent, richness, and more than all, its continued roductiveness for the past ten years, have justly entitled it to a high position mong mines.

The fissure that holds this vein extends north along the eastern slope of Mount Davidson about three miles, at an altitude of from 5,800 to 6,200 feet. It follows generally the irregularities of the slope, winding westward into the cañons, and and then receding with the projecting hills. Its course, upon the whole, has been estimated as north, 16° east. The dip is from 42° to 60° east. This fissure is between sienite rock on the west, and propylite on the east. Vein matter, resting against the sienite, rises several hundred feet above the croppings of the ledge, and contains in places small quantities of low grade ore. The sienite is the country rock on the west. It dips from 35° to 45° east; is uniform, and is lined with a dark blue clay selvage. Towards the north end of the ledge the sienite recedes to the west, and propylite takes its place as the country rock. Near the south end the sienite again disappears, and a hard, black, compact, hornblendic andesite is the country rock. The propylite on the east lies next the ledge through its entire length, and from the surface dips about 45° to the west, gradually changing to vertical, and at the depth of about four hundred feet, when, within one hundred and thirty feet of the west wall, it dips east at an angle of 45°. It is not regular, being sometimes nearly horizontal, then declining rapidly, or suddenly changing, it may ascend for several feet almost vertically. Generally it has no uniformity, no regular clay lining or course. At the surface the fissure is estimated at nearly five hundred feet in width, varying greatly at different points, the walls constantly approaching and receding without regularity.

The vein that fills this fissure assumed its shape, was divided and subdivided longitudinally, and cropped in sections, separated from one to two or three hundred feet; the intervening matter often being large masses of the country rock. In the southern portion of the ledge it dips west at an angle of about 45°. In the neighborhood of the northern line of the Overman Claim, it changes its dip to angle of about 70°. At this point it is about fifty feet in width; the walls are well defined, and have clay linings from two to ten feet in thickness. A seam of clay divides the vein at the depth of three hundred feet, near the center, in a northerly direction, as far as it has been explored, more than three hundred feet.

The quartz on the west side of this division, is finely crystallized and very compact. On the east it is coarse, and not so homogeneous. Subdivisions occur further south, and the dip changes by degrees until the vein is finally lost in horizontal strata of clay. North of the Overman claim the quartz lies in irregular sections, sometimes running parallel, sometimes lapping by each other, all having a southeastern dip in relation to the vein. Many of these sections, or perhaps more properly, sheets of ore, are very rich. At the top they are mere seams, but they increase in thickness to thirty, forty, or even fifty feet, and then gradually diminish and disappear. They are from one to six or seven hundred feet in length, north and south, and extend to various depths. Generally they lie nearest the eastern wall. Sometimes breaks occur in them horizontally, and the intervening quartz is usually comparatively barren.

In the central and northern portion of the ledge the ore is in chimneys, having a general dip of 75° south in the vein, and varying greatly in size. Ordinarily they are more vertical than the other vein matter, and occur next the eastern wall, frequently ascending closely into its irregularities. They sometimes form short spurs and branches. There is no regularity in their modes of recurrence. At intervals they are found side by side, differing only in size. Then they lap over each other, and again almost entirely disappear, leaving the vein nearly barren. In shape, there is no uniformity. Perhaps, generally, they may be described as oval, elongated masses, somewhat lens-shaped. Near the surface they are frequently separated by fragments of the country rock. Clay seams intervene, and occasionally barren quartz. Large bodies of ore several hundred feet in length, have been found running through these chimneys, and extending to the depth of two or three hundred feet. The richest ores are near the centres of these deposits, close to the east wall.

The occurrence of these masses along the vein has not been with any degree of certainty. Generally, where the vein was the strongest and cropped out most prominently, they have prevailed. In such localities they have been most productive, yielding each from ten to twenty millions of dollars. Descending from four to eight hundred feet, they have usually decreased in size and number. In places the vein is nearly barren from the depth of from one to two hundred feet, extending through most of its length. So frequent have these baren sections become, that constant explorations are necessary to sustain the supply of ore. These explorations are made by a large number of companies at a heavy cost.

Levels long ago supposed to be worked out have been re-opened, and large quantities of low grade ores taken out and reduced at a profit. Shafts have been projected and sunk to intersect the vein at the depth of a thousand or twelve hundred feet, with the expectation that rich deposits of ore will be found. These shafts pass all the way through the country rock east of the vein. The propylite contains seams and masses of clay. In the new shaft sunk by the Chollar Potosi Company, "much of the earth passed through was clay." The same remark is true in a measure of other shafts. At the depth of about six hundred feet, varying considerably in places, the water in the mountain ceases, the earth and rock become dry, or nearly so. Below this the temperature rises, and in some mines the thermometer stands above 100°. In the Bullion, at the depth of twelve hundred feet, it stands at 111°.

The following extracts are taken from the annual reports of the Superintendents of several of the principal mines, and sustain these statements.

Mr. T. G. Taylor, Superintendent of the Crown Point, in his report of May 1st, 1868, page 8, says: "The body of ore on five hundred feet level, (east) did not prove as extensive as was anticipated; seventy-six feet above and thirty-three feet below the level, the body of ore pinched out in porphyry, (propylite) and the most southern point worked was within one hundred and fifty feet of the north line. The total yield of the above body was 6,730 tons of ore. On the six hundred feet level, one hundred and fourteen feet from the shaft, we cut the west clay of the dry body of quartz, and found a new body of ore lying immediately east of us. When first cut it was very narrow, and has varied in width from three inches to fourteen feet, and has yielded already between the five hundred and seven hundred feet levels, 7,000 tons of ore. Have also found the same body on the eight hundred feet level. This body of ore has been known as the west body.

On the seven hundred feet level, one hundred and ninety-five feet east from the shaft, in November last we found another body of ore, which on the seven hundred feet level, extends one hundred and thirty-six feet from the north line, and has since been found on the six hundred feet level, the southern end of which was within fifty feet of the north line. Had worked on this body fifty-six feet above the six hundred feet level when the ore gave out. This body when worked from the seven hundred feet level up, has varied in width from two to nineteen feet. In March last we also cut this same body on the eight hundred feet level, two hundred and twenty-five feet east of the shaft; and it has been opened seventy feet from the north line. Judging from the dip of this body to the south, between the six hundred and seven hundred feet levels, on the eight hundred feet level, we shall find a very extensive body of ore. A winze has been sunk on this body from the seven hundred feet to the eight hundred feet level. The above body of ore has been known as the East body.

On the eight hundred feet level, between the east and west bodies, we have found two seams of very good ore; the two will make an average of four feet in width. Having done no work on either the middle or west bodies (eight hundred feet level) we are unable to state the extent of the same. * * *

The bodies of ore on the eight hundred feet level are not sufficiently opened to form any estimate of the amount known to exist in the three different strata. Between the five hundred and seven hundred feet levels we can safely count on between six and seven thousand tons now in place in the east and west bodies, and numerous seams that will pay to work."

Mr. Taylor in the same report, made the following statement in regard to the value of the ore extracted. "$14,184\frac{170}{2000}$ tons worked at Rhode Island Mill, yielded $497,331.87 ; average yield per ton, thirty-five dollars.

$11,773\frac{670}{2000}$ tons worked at outside mills, yielded $336,771.70. Average yield per ton, $31.15 ; six and a half tons worked at Ophir, (first class) yielded $1,925.03. Average yield per ton $296.15. Whole amount of ore worked, $25.964\frac{1140}{2000}$ tons. Total yield $866,028.60. Average yield per ton for the entire year, $33.35."

Mr. Isaac L. Requa, Superintendent of the Chollar Potosi, in his report of June 4th, 1868, page 9, says:

"The third Santa Fe was the most prolific level worked. The track floor of this slope lies three hundred and fifty-two feet from the surface. * * The ore deposit runs northeast and southwest two hundred and seventy feet, and east and west seventy feet, extending up one hundred and ten feet to the sills of the Santa Fe. The center of the body gave the better ore, and nearly the whole of this was taken out. The material at the ends and sides required careful selecting to get a low grade of millable ore. For ten months this section of the mine afforded a large daily supply. The yield continued up to the middle of February, when the station was abandoned, and marked on the chart as exhausted. From the south end of this slope to the south end of the Company's claim, lay six hundred feet of virgin ground. Through this a drift was made, and cross drifts one hundred and forty feet in length were driven, and the whole thoroughly prospected. The result of these explorations is an immense body of quartz, carrying metal, but in quantities so small as to preclude the hope that it can ever be made valuable to the Company. From this station down through to the first and second stations of the new shaft, the ground had received a very thorough examination, prior to the beginning of this fiscal year. Deeming it worth further attention, work was recommenced there in August. Nothing of importance, however, was developed. At the time work was resumed at these points, active operations were going on in that portion of the mine known as the 'Peck country,' but the section was abandoned through insufficiency of metal in the quartz."

Mr. Requa sums up the results of the work done in the mine as follows:

"For the year in the whole mine, one mile two hundred and eighty-six feet of drifts and winzes have been made, and five hundred and nineteen and a half feet of shaft and incline sunk.

In speaking of a new shaft, he says:

"The shaft has been sunk four hundred and fifty feet, making the total vertical depth, one thousand one hundred feet. * * The first and second stations, or five hundred or six hundred feet levels, were thoroughly prospected prior to the beginning of the year. At the third or seven hundred feet level the drift going north was continued until it reached a point within one hundred and sixty feet of the Company's north line, where cross drifts, one hundred feet in length, were driven through a deposit of quartz and clay, carrying no metal; work was suspended in this section on the twenty-seventh of August. At a point eight hundred and thirty-three feet from the surface, a deposit of ore three feet in width was met at the bottom of the shaft. This vein continued vertically for forty feet. Assays made from samples taken each day gave an average value of seventy-five dollars per ton. A station was made in the shaft eight hundred and fifty-three feet from the top, and drifts being made, this body of ore was prospected. It proved, however, limited in extent, and soon was exhausted. Seven hundred feet of prospecting drills were made in this station and no bodies of ore were found. The shaft penetrated the west wall at a depth of nine hundred and thirteen feet from the surface. Here a station has been made and an incline at an angle of forty-five degrees has been driven to the extent of two hundred and sixty-six feet in length. Two stations have been made in the incline, one at one thousand feet, the other at eleven hundred feet; leaving two hundred and forty-seven feet of unprospected ground overhead. Preparations are being made to drift to the east from the one thousand one hundred feet level. The incline will be continued down for another station. The developments to be made by these deep driftings are of immense importance to the Company, as on them depends the success of the future. Without seeming to predict what may lie in the unexplored section to the east, it is presumable from indications that are observable throughout the mine, and especially in the deeper workings, that deposits of fine ore will be found in the vicinity of the present bottom of the incline."

Mr. Requa gives the total yield of the mine for the fiscal year as "$694,626.91 in gold, 960½ fine, and $1,173,015.16 in silver. Total, $1,867,642.07."

Mr. Louis Janin, Jr., Superintendent of the Gould and Currey, in his report of December 16th, 1867, says:

"The various prospecting works were prosecuted during the year as vigorously as circumstances would allow. A great deal of money was expended upon them, but no ore was found. The following comprises the work done. Between the second and fourth stations from the Bonner shaft, the incline was continued twenty-one feet in depth, and then connected with a winze up from the fourth, seventy-three feet deep.

This incline passed through the body of the quartz mentioned in the last annual report. This body was thoroughly prospected, but no ore in any amount was found. The quartz gave out in every direction. On the fourth station, the north branch was continued a distance of one hundred and forty-four feet. A west drift was started from its end and carried to the west wall, through a mixture of quartz and porphyry, without ore.

An east drift was also run from the main north branch a distance of two hundred and ninety-two feet, without any important development.

The south branch on the same station was continued ninety-three feet, and here also the west wall was struck. An east drift from this branch was run a distance of two hundred and two feet. Some little quartz was found, but the last hundred feet was in porphyry. The winze up the incline is a short distance south of this drift.

To sum up the prospecting work on this station: the claim has on this level been explored opposite the Bonner shaft by an east-and-west drift three hundred and sixty-five feet long, and on its length upwards of eight hundred feet; the northern end has been cut east and west by more than four hundred feet of drift, and near the south end by an east drift of two hundred feet.

On the fifth station, all the work done is comprised in a west drift from the shaft seventy-six feet in length, and a south drift three hundred and sixty-four feet long. No sign of ore was met with.

On the sixth station, the opening or mouth of the station was made on the eastern side of the shaft. As all efforts to find ore to the west, north, and south of the Bonner shaft proved futile, it was considered advisable to search to the east. A drift was therefore started in this direction, and its length is now three hundred and ten feet. Some flattering indications were met with, but no trace of ore was found.

The Bonner shaft has now a depth of nine hundred and ten feet from its mouth, or 1,110 feet below the croppings. The bottom is eighty-five feet below the sixth station, and the rock, which has been very hard and tough, is of a more kindly nature, and better progress will hereafter be made. The sinking will be continued until the west wall is reached, which will be within the next hundred feet. The stations yet to be opened from the shaft will depend in a measure upon the developments made in the east drift, sixth station. If they are not favorable, a north-and-south drift will be started from the seventh station, and cross-cuts will be made from the end of these.

The ore reduced during the year was obtained principally from the upper part of the mine, formerly worked over, with the tailings and slime. The yield was $213,925.30 in gold, and $393,835.31 in silver; total, $607,760.61; average per ton, $25.02."

Quotations might be made to the same effect from the reports of the superintendents of other mines.

From these statements the following facts seem to be clear: 1st. That the country rock west of the Comstock Lode is sienite; that the wall dips very regularly 45° east; that it follows the windings of the hill generally; that it has a lining between it and the vein of dark bluish clay, and that a low grade of ore usually lies next to it.

2nd. That the country rock on the east side of the ledge is propylite; that the wall is very irregular in its course; that near the surface it dips about 45° west; that it changes gradually, and at the depth of about four hundred feet becomes vertical, and then at a point a little lower dips to the east about 45°, where the fissure is about one hundred and twenty-five or thirty feet in width; that this wall has no definite and confined clay lining, and that the richest masses of ore are found next to it.

3d. That the vein-matter cropped on the surface in places to the width of five hundred feet; that it was split and covered over very much with slides from the walls; that it filled the fissure, took its course, width and dip; that the ore is found in irregular sheets and chimneys, with a dip in respect to the vein of about 70° southeast; that these sheets and chimneys decrease in number, size, and value in the lower levels, and that large masses of quartz, nearly barren, intervene.

4th. That the slides covering the surface of the vein and splitting it, were originally from the walls—being on the west sienite, on the east propylite; that their length was often hundreds of feet, and that, descending, they diminished in size until they have nearly disappeared. In the lower depths they are mere fragments, and not of frequent occurrence.

In regard to the minerals found in the ledge, it may be stated that on the surface the croppings consisted of white quartz, containing traces of silver, but not very distinct or promising. On the eastern slope of Cedar Hill, of Mount Davidson, in the neighborhood of Gold Hill proper, and further south, native gold occurred in a yellowish, porous quartz, colored by metallic oxides. In the earlier openings, chloride of silver was prevalent, but gave place to sulphurets about the water level. Gold decreased and almost disappeared at the depth of from two to three hundred feet. About the water level, and a little below, the quartz was much broken and crushed, so that blasting was not necessary in its removal.

It is more compact in the lower levels, where gold is becoming abundant and forms an important element in the wealth of the mines. Besides native gold, there is found in the vein black sulphurets of silver, (polybasite) ruby silver, (pyrargyrite) horn silver, vitreous and native silver, iron pyrites, galena, carbonate of lead, phosphate of lead, (pyromorphite) zinc-blend, and iron pyrites. Gypsum occurs in places. Carbonates of lime have occasionally appeared. Crystalization is imperfect, and the minerals are not usually very brilliant.

The following are the names of the mining claims on the Comstock Lode, with the number of feet in each.

Utah	1,000	Gould & Curry	1,200
Allen	925	Savage	771
Sierra Nevada	1,959	Hale & Norcross	400
Union	500	Chollar-Potosi	1,434
Ophir, North	1,200	Bullion	940
Mexican	100	Exchequer	400
Ophir, South	200	Alpha	278⅓
Central	150	Apple	31½
California	300	Imperial	118
Central, No. 2	100	Bacon	45
Kinney	50	Empire North	55
White & Murphy	210	Eclipse	30
Sides	500	French	20
Best & Belcher	250	Empire South	20
Plato	10	Burke & Hamilton	40
Bowers	20	Yellow Jacket	943
Piute	20	Kentuck	93⅔
Winters	30	Crown Point	540
Consolidated	21	Belcher	940
Rice Ground	13½	Segregated Belcher	160
Imperial H. & L	65⅔	Overman	1,200
Challenge	50	North America	2,000
Confidence	130	Baltimore American	200

As a large majority of these mines are being worked in their upper levels for low grade ore while deep explorations are being made, I shall not add a minute description of each.

The Sierra Nevada is sinking a shaft, now down seven hundred feet, and a prospecting tunnel eastward through vein matter.

OPHIR.

But little work has recently been done in the lower levels. There are large quantities of low grade ore in the upper part of the mine which it is proposed to remove and reduce. A new shaft is being sunk between F and G streets, 1,100 feet east from the old shaft. Three hundred feet of the first part of this shaft passes through propylite and clay, comparatively easy to work. But a hard, compact porphyry then intervenes, and only a space of from twelve to fifteen feet was excavated per week.

The shaft has reached a depth of five hundred and forty-five feet. Large quantities of water have been removed. Three twelve-inch pumps are used for the purpose. There is a station at the depth of two hundred and fifty feet. There are two plungers above.

From the fact that the amount of water has decreased as the dry season advanced, it is inferred that it is from the surface. It is estimated that the shaft will intersect the vein at the depth of twelve hundred feet.

The California Central No. 2, the Kinney, White & Murphy, Sides, and the Best & Belcher are consolidated, and are leased to be worked in their upper levels

GOULD AND CURRY.

Mr. Alpheus Bull, President of the company, in his report, December 16th 1867, says:

"Explorations extensively and vigorously prosecuted in various parts of the mine, in search of new bodies of mineral, have led to the absorption of the entire receipts of the past year.

"The result of these costly explorations has not, I regret to say, been of a very encouraging character, no important deposits of ore having been discovered through these developments, nor were any very flattering indications met with of the existence of such.

"A considerable portion of the ore taken from the mine the past year was selected from out of the fillings of 1862 and 63, in the old upper chambers, rendering the cost of extraction greater than if the ore had been mined from new or undisturbed ground.

"Notwithstanding all the ore produced has been of a very low grade, even for third class, it has yielded sufficient bullion to defray all ordinary current expenses, such as mining and milling; also, for the extensive developments, cost of repairs, and for such new machinery as was required for the mill and the Bonner shaft. The reserves of ore have proved to be much larger than was supposed they were at the last annual meeting of the stockholders. The total number of tons raised the past year is 24,940, at an expense for mining and milling of $24.35 per ton. 25,043 tons were reduced at the company's mill; the product of bullion was $601,641.09, or an average yield of over $24 a ton."

Mr. David Bowie, Secretary of the company, has kindly furnished the following summary of the work for the year 1868:

	Tons.	Lbs.
"December 1st, 1867, ore on hand	900	00
November 30th, 1868, ore produced to date	12,153	1,090
Totals	$13,053	1,090

Ore Delivered.

December 1st, 1867, to November 30th, 1868:		
Ore worked	1,229	30
Ore sold	11,791	90
Ore on hand	33	970
Total	13,053	1,090

Expenses.

Extracting ore	$19,579 82
Prospecting and dead work	90,656 44
Accessory work	5,091 63
Improvements	10,353 55
Total	$125,681 44

Receipts from all sources	$101,981 44
Expenditures of all departments	196,264 55
Excess of expenditures over receipts	94,283 11

Depth of Bonner shaft from surface, Dec. 1st, 1868, 1,149 feet; depth sunk during the year ending 30th November, 1868, two hundred and fifty feet."

SAVAGE.

The vein has a width of from 10 to 80 feet in the lower levels. In the southern part of the mine the chimneys dip toward the north-east; in the south end toward the south-east, indicating a deep disturbance. They vary greatly in richness. The sixth level is not opened sufficiently to form an estimate of the character of the ore, but in the fifth level it is not so rich as it was in the fourth, being only about an average with the ore in the third level.

The President of the Savage Mining Company, in his report of July 11th, 1868, says: "The amount of ore, of all classes, extracted from the mine, for the year (fiscal) now ended, is 87,342 tons, and comes quite up to the estimate at the beginning of the year, while the product of the bullion from all sources is $3,506,082.97, which exceeds the yield of the previous year by over a half million dollars.

"Monthly dividends have been regularly paid, varying in amounts according to the monthly net earnings; and the previous reserves of the mine give assurance of the continuance of these profits for some months to come.

"The gross amount disbursed to the stock holders for the past year is $1,560,000, being $97.50 on each share of the present capital stock, or $1,950 per foot, making the percentage of dividend from the entire year's product 44½, while for the year before it was 38½. This difference must in the main be attributed to a reduction in the cost of extracting and reducing the ores.

"Herewith I submit a summary statement of all the receipts and disbursments, as well as the average yield of all ores extracted from the mine, and the percentage of all dividends paid since the company's organization, up to the end of this fiscal year.

	Tons.	Lbs.
Total amount of ore extracted	270	521
Total amount of ore reduced and sold	268	838

Gross receipts in bullion and from ore sold	$11,327,697 53
Average yield per ton of all ores	42 13
Total assessment paid $11.75 per share	188,000 00
Forty-two dividends paid, amounting to $222.50 per share, or	3,560,000 00
Percentage of receipts paid in dividends	31 42

BULLION.

The ledge at this place is one hundred and sixty feet in width, at the depth of four hundred and eighty feet. It is sixty feet wide, at the depth of twelve hundred feet. At the depth of six hundred feet there is a large body of low grade ore. The walls approach each other at either end of the claim, and recede towards the center. At the depth of eight hundred feet, the ledge contracts considerably. There is no water in the mine below this point, and the vein matter is perfectly dry to the lowest points exposed, about twelve hundred feet, where the thermometer stands at 111°. In a drift a few feet distant from the bottom of the shaft the temperature is several degrees higher. Near the surface it is about twelve degrees lower. It is expected that the shaft will intersect the vein at the depth of fourteen hundred feet.

The Exchequer, the Alpha, and the Apple are not so thoroughly explored as the Bullion, and the vein exhibits no peculiarities. The deepest shaft is six hundred and forty feet vertically, with an incline three hundred feet. The east wall is lined with black clay in places ten feet in thickness. The west wall has not been found at so great a depth.

IMPERIAL.

From the surface to the depth of one hundred and eighty feet the ledge dips west 35°. The west wall is very irregular, and has very little clay lining. It consists of hard, black, compact andesite. Gradually the dip of the ledge changes, until, at the depth of six hundred feet, it dips east 45°. It varies in width from one to two hundred feet. The east wall is propylite, lined with hard, black clay, from two to twelve feet in thickness. The ore lies in seams or sheets, with intervening masses of barren quartz or clay.

The Imperial and Empire shaft is sunk jointly by the Imperial and Empire Companies, five hundred feet due east from the old Imperial shaft. It has reached a depth of one thousand and sixty feet. At the depth of nine hundred feet there is a drift westward to the vein. It passes one hundred and thirty feet through propylite, ten feet through black clay, and one hundred and eighty feet through vein matter, which is very homogenous, and one hundred and sixty feet further through quartz and compact porphyry. Two inclines connect this drift with the old works. A level runs north and south on the vein the whole length of the claim, disclosing small seams of ore assaying $40 per ton. The shaft, it is estimated, will intersect the vein at the depth of one hundred and twenty-four feet. At the depth of nine hundred feet a large quantity of water appeared, after cutting the clay lining on the eastern wall.

There are several claims south of the Imperial, each extending along the vein from ten to one hundred and thirty feet. But a minute description of either the works or the vein through so short a distance would not be attended with remarkable results. It is a general fact that the sheets of rich ore are formed mostly in the upper levels.

YELLOW JACKET.

The old works, to the depth of seven hundred feet, have been in a great measure abandoned. Most of the ore is being taken from levels at the depth of seven, eight, and nine hundred feet in the south part of the mine. The width of the vein in this neighborhood is forty feet. The dip is 60° east. The shaft is in the vein matter on the west side. The ore occurs near the east wall, and is uniformly rich. There is a clay lining between the vein matter and the walls. The country rock on the west side is sienite. In the lowest level, the vein presents a very promising appearance, and the ore is of a fine quality.

OVERMAN.

The dip of the ledge is west 45°. It changes to 75° east near the north boundary of the claim. Work is being done at the depth of four hundred feet, where the vein is fifty feet wide. About where the dip changes, it varies from twenty-five to fifty feet, but is otherwise quite regular. The walls are well defined, and have clay linings from two to ten feet in thickness. A clay seam commencing at a depth of three hundred feet divides the ledge vertically, and in a northern direction, as far as it has been explored. A number of clay seams run parallel with the ledge in different places and at various depths.

DIAGRAMS OF THE MINES ON THE COMSTOCK LODE.

During last winter, Mr. King was engaged several weeks in making a careful and thorough survey of the mines on the Comstock Ledge. He prepared elaborate diagrams, and was assisted by Prof. Stretch and Mr. James, who are well acquainted with all the works and developments which have been made. These diagrams, it is expected, will be lithographed at Washington, and Mr. King has promised me a full set for the State of Nevada. I have examined them, and regard them as invaluable in obtaining a complete knowledge of these mines.

About a mile and a half or a little more east of Virginia City a ledge crops out in places, and is parallel with the Comstock. Several claims are located. One of the most prominent is the Occidental. The ledge dips east about 45°, is very regular, and has an average width of about twenty-five feet. The ore regarded as valuable is in the form of a sheet, from four to about twelve feet in width The mine is worked through a tunnel, about nine hundred feet in length. It is well ventilated, and is easy of access. There are large quantities of ore in sight, not assorted, and which will yield a profit of from $6 to $8 per ton in gold and silver. There are both chlorides and sulphurets of silver. The gold is invisible in the ore. The east wall has a lining of clay from four to twelve feet in thickness. There are indications that this mine will increase in value at greater depths. It is being opened by a lower tunnel, which will show its character at the depth of about six hundred feet.

THE COUNTRY EAST OF WADSWORTH.

The arm of the desert which crosses through the north-east corner of Storey County, towards Pyramid Lake, opens out south-eastward into the great depression about the Sink of the Carson and Humboldt Rivers. Along the line of the foot-hills of the mountains which run northward from this depression, there is a narrow belt of tufa, containing calcareous and silicious matter, and extending almost continuously for many miles. The hills are very barren, and are covered with broken fragments of basalt. They afford but limited quantities of either wood or grass. The plain presents a wide level surface, covered with sand, supporting only a meagre growth of sage, and several varieties of hardy flowering plants. In May, even this desert blooms.

Further east are stretches of large alkali flats, and chains of low, ash-colored sand hills, without a shrub, flower or living thing. Were it not for a more cheering prospect in the distance, the desolation would be complete. Ten or fifteen miles north and east of this, there are several warm springs. The highest temperature noticed was 198°. They are surrounded by the usual silicious deposits, so extensive in this instance as to show that at some former period the flow of thermal waters was much greater than at the present time. Sulphureted hydrogen gas is perceptible—in places quite abundant. Trinity mountains rise in a range of low barren hills just east from these springs.

HUMBOLDT COUNTY.

This is one of the largest counties in the State, and probably exhibits the greatest diversity of character. The northern portion is traversed by a succession of lofty mountains, with high peaks and broken sections, having easy passes intervening. Toward the northeast there are high basaltic table lands, and in the south and western portions, valleys, sandy plains, and depressions below the general level of the country. In the winter many of these are covered with water for long distances, which evaporates during the dry season, leaving an efflorescence of mineral salts and alkalis several inches in thickness, white as snow. While wet, these flats are very miry, and when dry become hard and smooth, so that a heavy wagon may pass over them and scarcely leave a mark. No vegetation can grow in such places. The fertile lands along the Humboldt River, the meadows bordering upon Wheeler's Creek, and those found about the sink of Weatherlow's Creek, and near the head of the Umashaw, with a wide belt of arable land through Paradise Valley, constitute the largest sections susceptible of cultivation in the county. Grass and hay are among the most important productions; but recently attention is turned to the cultivation of wheat, barley, corn, rye, and oats, with the most satisfactory results. Vegetables of every kind usually grown in a temperate climate are annually produced in the greatest abundance and are finely flavored.

The popular vote of Humboldt county, according to the official returns, is 599.

Unionville is the county seat, and is situated in a cañon on the eastern slope of Star Mountain. It has a public school and about 250 inhabitants.

Star City, twelve miles north of Unionville, is nearly abandoned.

Humboldt City, a few miles west of Star, on the western slope of the mountain, is also almost deserted. These places are dependent upon the mines, and work has been mostly suspended for several years.

Oreana is twenty-five miles southwest from Unionville, on the Humboldt River, and has a population of about 100.

Dun Glen, twelve miles from Star, in the next range of mountains east, is about half the size of Unionville.

Centerville, generally known as Winnemucca, is on the railroad, about thirty miles northeast of Dun Glen, and has from 300 to 350 inhabitants.

Argenti, a few miles east of the mouth of Reese River, on the railroad, is a thriving hamlet.

TRINITY MOUNTAIN.

The geological developments noticed in these mountains have great interest. The range is composed of a series of hills or ridges, running nearly southeast and northwest. They have smooth passes with easy grades between them, and each hill has its peak, sometimes rising boldly on the east side of the range, but more frequently the highest are nearer to the west. Trachyte is the principal rock in the southern sections of the mountain west and a little north of the Humboldt Lake. In places it crops out, showing a variety of colors, beautifully arranged, and passing almost imperceptibly into each other. It has a general dip southeast, changing to east, of about 25°. This rock, further north, is overlapped with a section of black basalt, very broken near the foothills on the east; more massive towards the summit westward, where it is columnar in places. Trachyte succeeds and forms some of the highest peaks in the range. There is one of peculiar interest, having an altitude of about six thousand feet. It is a little disconnected, and stands to the eastward of the summit of the main range. It is much the shape of a section of a convex lens, quite regular, but rough, and exposes on the crest and eastern side, for hundreds of feet, a wall of trachyte completely columnar. The structure is beautiful. The columns dip slightly to the west. They are from one to ten or twelve inches in diameter, jointed, smooth, four, five and six-sided, and project from one to six feet. This is probably among the most interesting instances of columnar trachyte known.

A few miles further north, the trachyte is again imperfectly columnar, but south of Trinity Peak it is uninterrupted by transition slates, masses of quartzite, and a belt of propylite; but it appears near the summit, and forms the crest at an altitude of about 6,760 feet. It stands nearly vertical. To the north, the trachyte is again overlapped with basalt, massive and columnar to some extent. The rocks are very broken, and become precipitous, exhibiting a variety of colors. There is some lava and schorl in dykes, and along the base of the foot-hills toward the Humboldt, silicious tufa, the deposit of thermal springs now dry, extends northward some distance. Further north a few miles, transition slates occur. Nickel is found, but its extent is not known. On the east of the main range granite appears, and gradually rises towards the northwest, and becomes the principal rock of the mountain to its termination. There is some wood in places, the juniper growing in the cañons to a limited extent. The bunch grass is not generally abundant, and the whole range is very destitute of water.

TRINITY DISTRICT.

This district covers the north end of Trinity Mountain. It was organized in June, 1863. The mines are in low hills about three miles northwest of Oreana. The veins are parallel and appear on the surface, and have a general course northeast and southwest. It is difficult to determine certainly as to the number of the ledges—whether in fact there is really more than one, with its spurs, angles and variations. Further developments will decide.

MONTEZUMA.

Two thousand feet are claimed on the south end of the ledge. Dip 45° northwest. Walls well defined and a little warped. Width of vein about ten feet—all bearing metal. The country rock is porphyritic trachyte. The ore works from $72 to $300 per ton in silver. It contains chloride of silver, oxide, and carbonate of lead, and oxide of antimony in such quantities that it often yields more than fifty per cent. of metal. It does not require crushing, but is reduced by smelting.

CHLORIDE.

This claim contains 1,800 feet, and is situated about a quarter of a mile north and west of the Montezuma. The walls are not clearly defined, the ore frequenly adhering to the country rock, rendering the width of the ledge uncertain. A quantity of fine chloride ore is taken out and has been reduced with encouraging results. The work done on these mines is so limited, that their true character cannot be determined.

MONTEZUMA SMELTING WORKS.

"This establishment, the most extensive and complete of its kind in the State, was built in 1867 at Oreana, on the Humboldt River. There are eight furnaces; two for smelting, four for calcining, and two for cupelling. Its capacity is sufficient to reduce thirty tons of ore in twenty-four hours. Before smelting, the ore is broken to about the size of an egg, then placed on large floors in beds of about ten tons each. Over this the fluxes are spread, which are changed from time to time to correspond with the character of the ore and condition of the furnace. The furnaces are cupolas twelve feet high between the base and feeding doors, and twenty-eight inches inner diameter, with a high chimney for draught. The fluxes are few and simple. Charcoal is used as fuel. Six men, divided into two shifts of twelve hours each, feed fifteen tons of ore through one of these furnaces in twenty-four hours, exclusive of the fluxes and fuel which they also handle. From the smelting furnaces, the metal, now consisting of lead, silver and antimony, is passed into the calcining department, where the antimony is separated in large reverberatory furnaces, of which there are four, each of a capacity to receive thirteen tons of metal at a charge, and thus work at least from twenty-five to thirty tons at a heat; for after the first charge of metal begins to lose its antimony, the quantity is kept up until the calcining pan is found to be full of only pure lead and silver. When this stage is reached, the metal is run off and sent to the refining department. Here the lead is separated from the silver by cupellation, in furnaces built after the ordinary English plan, with movable tests. There are two cupelling furnaces, each of a capacity to reduce from one and a half to two tons per day (twenty-four hours) of the metal received from the calcining furnaces. Two shifts of two men each are required for each furnace every twenty-four hours.

"The litharge resulting from cupellation is all economized, being returned as a flux and run through the furnace again and again. As it comes from the cupelling furnace it is pure, less ten per cent. The silver is from .997 to .998 fine. About forty-five thousand dollars is the ordinary annual product. The charcoal is brought from the Dun Glen Mountains, a distance of twenty-five miles, and is an important feature in the works. One hundred thousand bushels are contracted for, as the supply for the present year (1868). The quantity required in reducing a ton of ore is about fifteen bushels, and costs fifty cents per bushel. The sage is used for the reverberatory furnaces. The boneash, for cupelling, is obtained from the bones of cattle gathered on the desert along the old emigrant road by the Indians, and pulverized in an ordinary stamp battery.

"The entire cost per day for fuel is two hundred and eighty-seven dollars. Twenty-five men are employed in the works; from two to ten in the mine. Average cost of mining the ore, per ton, is about two dollars. Hauling about the same. Smelting twenty dollars; calcining nineteen dollars, and refining twenty-eight dollars." This cost is too great, and hence before the railroad was completed most of the profits were consumed in expenses.

A battery of five stamps was attached to the works during the early part of last spring, and the ore from the chloride mine was crushed and reduced by the ordinary mill process.

The above description of the Montezuma Smelting Works is quoted mostly from the Report of the County Surveyor and of the County Assessor, made in 1867, and is confirmed by my own observation.

STAR RANGE.

The mountains which rise immediately west of the Sink of the Humboldt and Carson Rivers, connect on the north with the Star Range through a low pass and are really a part of it. From the Humboldt Lake, the river passes south for a few miles in the form of a slough, and then turns east, sweeping round the south end of these mountains, and finally falling into the Sink, which runs north on the east side of the low hills for a short distance. The summit of the highest peak, just east of the Humboldt Lake, has an altitude of about 6,336 feet. In the geological formation there is but little similarity between this and the Trinity Range. The prevailing rock in the neighborhood of the peak is limestone of the Triassic age. It is finally crystalline in places, and would probably bear a good polish and make a fair marble. Calcareous slate and masses of quartzite crop out near the summits occasionally, and the lower hills towards the south are capped with broken basalt, and show croppings of trachyte. Northward, porphyry, generally of a dull, red color, and slates, quartzite and limestone prevail. These rocks extend through the Star Range, and often occur ascending in nearly the order they are named. Dykes of other rock are also found. In Peru Cañon, half a mile south of Unionville, there is an outcrop of melaphyr. It is exposed but a short distance as it crosses a sharp ravine. The ledge stands nearly perpendicular about twenty feet above the surface, and is some thirty feet in thickness. It is very hard and compact, and breaks with difficulty.

Star Peak and the peak immediately south of it, are composed principally of a dark, iron-stained quartzite. This rock seems to underlie the mountain, and appears massively on either side in many places. Spurs and hills are composed almost entirely of it. Above it there is a heavy capping of limestone, seamed with spar, several hundred feet in thickness, extending almost continuously for thirty or forty miles along the summit. This mountain is exceedingly regular in all its characteristics. Its course is about due north. Its spurs and cañons are at right angles with the main range, and it is broken only by a single pass near the south end. The altitude of Star Peak is about 9,975 feet—usually estimated at ten thousand feet. It is a splendid land-mark, and is not equaled in height by any peak in the neighborhood. Star Range sinks within about twelve or fifteen miles of the Humboldt River on the north.

BUENA VISTA DISTRICT.

An organization of this district was effected in 1861. Unionville is situated near its center in Buena Vista Cañon. A beautiful stream of pure water, sufficient to run a large number of mills, flows through this cañon, and sinks on the desert a few miles southeast. Never-failing springs and small streams are formed in other parts of the district. The supply of wood is limited, most of it already having been cut away. Near the heads of the cañons, some mountain mahogany and a few stunted junipers are found. The bunch-grass grows in the greatest luxuriance everywhere over the hills. A large number of mines were originally located, but at present only two or three are being developed.

ARIZONA.

The vein upon which this mine is located, was discovered in October, 1862, by Mr. Wm. Graves, and E. D. Kelley, and runs nearly due north—slightly northeast. It crops across the summit of a high hill about a mile southwest of Unionville. It dips towards the southwest at an angle of 45°. On the east of the Arizona a little distance, the Manitowac is located. It was at first supposed to be on a separate ledge, having a dip of only about 8° or 10° to the west, and a width of from one to three feet, with well defined walls. The explorations made, however, though not sufficient to determine with absolute certainty, indicate strongly that the Manitowac is only a section of the Arizona lapped over, or it may be thrown off a short distance. The Arizona Company claim 900 feet on the ledge. A tunnel is run from the north, a little below the crest of the hill for a distance of two hundred feet, disclosing all the way a well defined ledge. An incline starts from a point midway along the tunnel, and follows the ledge to the depth of near a hundred feet. Water was reached at the depth of eighty feet, where the ledge is about four feet in width. Near the surface in the tunnel the ore contained chloride of silver,—some horn silver. This soon changed into dark sulphurets, with a trace of copper and a small quantity of galena. The yield has usually been about forty dollars to the ton above all expenses.

The capping of the hill through which the ledge appears, is limestone—abounding in fossil ammonites. Calcareous slates appear in the shaft only a few feet below the surface. These formations compose the country rock on either side of the vein, as far as the work extends. The hill, however, shows masses of dark colored quartzite, and of a red colored porphyry, very compact, only a short distance to the eastward. As far as explored, the walls are regular and lined with a fine clay selvage.

SOUTHERN EXTENSION OF THE ARIZONA.

This mine is on a continuation of the Arizona ledge, and the characteristics are the same in every respect. It is opened by an incline to the depth of one hundred and thirty feet. The walls seem regular, and are well defined. The vein at the bottom of the incline is from four to five feet in width. The ore is rich in sulphurets of silver. At the presant stage of development the mine gives every evidence of being permanent and valuable.

THE PERU

Is in the neighborhood of the Arizona. The vein matter crops out for a long distance. A shaft is sunk to the depth of fifty-five feet, and shows a well-defined ledge about five feet in width, dipping 45° west. The ore has yielded about forty dollars per ton. It contains some lead and antimony.

NEVADA.

This claim is about half a mile east of the Arizona in Peru Cañon. The vein is traceable on the surface. From the face of the hill to the northeast, and about four hundred feet below the ledge, a tunnel is run towards it three hundred feet. It is expected to intersect it within about seventy-five feet. A tunnel further west and higher up the hill reaches the ledge and follows it by a shaft for fifty feet. It is here about four feet wide, well-defined with regular walls of porphyry. The ore shows but little base metal, and works about fifty dollars per ton.

CORNELIAN.

This claim is south of the Nevada, perhaps a mile or more, on the eastern slope of a high spur. It is a blind ledge; a quantity of very rich float rock containing sulphurets of silver, and working by ordinary mill process, from three to four hundred dollars per ton, was found in an early day. The place was located as the Cornelian. A tunnel was run southwest, nearly south for four hundred feet, all the way through a partially decomposed red porphyry. This rock runs slightly west of south. If there is a ledge in this neighborhood, the surface indications are that it will be found to the west of the present tunnel.

PIONEER MILL.

This mill was erected at Unionville, by Mr. J. C. Fall, several years ago. It has four double stamps, small size, and four pans. Sage collected by Indians is used for fuel.

A new ten-stamp mill is being completed, designed to work the ore from the Arizona by dry process.

ECHO DISTRICT.

This district is directly opposite Buena Vista, on the western slope of the mountain. There is water, but only a small quantity of wood. Grass is abundant.

MOUNTAIN KING SERIES.

Here are three ledges each covered with claims of 2400 feet, all located by James Ferguson, in March, 1863. The series extends north along the side of the mountain at a great elevation. The width of each ledge is not certainly ascertained, as the exploring has been very limited. The following statement is only given as an approximation. The Havana is about fourteen feet in width; the Carson, forty, and the Nevada, five feet. A shaft is sunk on the Carson to the depth of thirty-three feet, following the west wall. A tunnel extends twenty-two feet east from the bottom of this shaft, through vein matter without reaching the wall. A tunnel projected from the bottom of Panther Cañon is completed three hundred and twenty-six feet, and it is expected to intersect the ledge at a depth of five or six hundred feet. The cost of running this tunnel is about thirty dollars per foot. The ore shows some free gold. The country rock is quartzite, stained with iron—and is very hard and fiery.

WASHINGTON SERIES.

Located at the same time and by the same party, as the Mountain King Series; is about half a mile further north, and also consists of three ledges—the Washington, Jefferson and Madison; the claim has nine hundred feet in each vein. The croppings are so broken and the veins so imperfectly marked, that it is difficult to estimate their width with certainty, exact course, or dip. They seem to lie parallel, and not far from each other. A tunnel has been run from the side of a cañon further west, toward the ledges, for one hundred and seventy feet, and may intersect them at the depth of about two hundred feet from the surface, and at a distance of four hundred feet from its mouth. The croppings show free gold. The country rock is quartzite.

STAR DISTRICT

Was organized in 1861, and embraces the region drained by Star Cañon on the eastern slope of the mountain. This district is much broken by high and rugged spurs, with almost precipitous sides. Star creek has at its lowest stage about seventy inches of water, and is often suddenly and greatly swollen by the melting snows in the summer and heavy rains in winter. It is a regular mountain torrent. Bunch grass is abundant, but there is scarcely any wood.

DE SOTO.

This claim is properly the first southern extension of the Sheba, and was located in May, 1861, by Mr. James Miller and others. It covers 1980 feet. The vein is, on an average, about four feet in width. It dips about 45° to the west, and runs north and south. A deep cañon, crossing this ledge near the northern boundary of the claim, affords a fine opportunity for opening it. Three tunnels are run south on the ledge at various depths. The upper tunnel enters the hill to the distance of one hundred and thirty feet. At the end is a cross-cut four hundred and eighteen feet, following a succession of chambers of ore which are without much regularity in form or recurrence, but which have yielded valuable returns. An air shaft connects with this cross-cut at the depth of one hundred and fifty-nine feet below the surface.

The second or middle tunnel is six hundred feet in length. A shaft drops from the end of it thirty-one feet through vein matter, and a deposit of fine ore. The lowest tunnel extends three hundred and fifty feet south, on the ledge; which gradually widens from three to eleven feet. At the end of the tunnel, the vein is considerably broken and split. Through all these openings the walls are more or less irregular. That on the west is a dark slate. That on the east is a hard silicious gray limestone. The ore has varied greatly in richness, working from sixty to twenty-five hundred dollars per ton. Much of it has been shipped to England. A very little chloride ore was found near the surface. The sulphurets prevailed largely in every part of the mine, and are accompanied with lead, antimony and zinc.

SHEBA.

Located in May, 1861, by W. W. Davis and others. The claim has 1,800 feet. The mine consists largely in a series of deposits or sheets of ore lying horizontally, and having a width of about three hundred feet east and west, and a length of about six hundred feet north and south, and from the surface a depth of two hundred feet. It is stated by persons acquainted with the facts, that the first class ore from some of these deposits yielded as high as $1,200 per ton; second class, $250; and the third class $150. Specimens were frequently found which yielded one dollar per pound. It all required roasting. The mine is not worked at present.

NORTH SHEBA.

A tunnel has been run about sixty feet, and discloses a ledge two and a half or three feet in width, well defined, with regular walls. The course and dip of the ledge, and also the grade of ore, are about the same as in the De Soto.

SHEBA MILL.

This mill has ten stamps, four roasting furnaces, and six pans. It is not running.

SULPHUR BED.

Opposite Star City, some five or six miles, and west of Humboldt City, on the plain, there is the most extensive sulphur bed now known in the State. It is covered with a layer of debris, from a few inches to three or four feet in depth. It has been opened in many places over an area of fifty or sixty acres. The sulphur, when the earth is removed, extends horizontally in every direction, and to an unknown depth. Shafts and excavations penetrate it ten and twelve feet, and many tons have been thrown out. It is very nearly pure and is highly crystalized. It is used successfully in the manufacture of sulphuric acid.

VALLEY EAST OF STAR AND THE DUN GLEN MOUNTAINS.

The valley east of the Star Range is from eight to twelve miles in width, generally very sandy, and rendred barren with alkali. It has but a few fertile spots, and but very little pure water. South of Unionville there is an alkali flat filling the valleys for about twenty miles. During the rainy season it is a lake. The Dun Glen Mountains southeast of this are capped with limestone, similar in character to that found in the Star Range. Fossils are abundant, belonging to the Triassic period. Northward the rock is displaced by rhyolite, which in turn yields to granite further north on the western slope and the summit. On the eastern slope, quartzite prevails for eight or ten miles. This is succeeded by slates and chlorite schist. About east from Star City, on the Dun Glen Range, there are extensive flows of basalt, covering the entire mountain from base to base for twenty or twenty-five miles. Along the summit and on the eastern slope it is level as a table for eight or ten miles. Occasionally it is broken by cañons, where it assumes the columnar form. Towards the north of this flow there are dykes filled with dark quartzite. Granite then succeeds, and the mountain rises to a greater altitude, and is somewhat precipitous. A section of limestone overlaps the granite with intervening quartzite. Generally the rock dips to the west at an angle of forty-five degrees. The northern part of the mountain takes its character from this formation. Quartzite generally prevails on the eastern slope.

This range is thickly set with the finest quality of bunch grass through the whole distance explored. In limited localities it stood almost thick enough to mow. Water is also abundant and good in the cañons. There is a meager supply of wood. Juniper is sparsely scattered along the hill sides.

SIERRA DISTRICT.

This district was organized in January, 1863. Dun Glen is its business center. It is in a deep cañon, and has a small but never-failing supply of good water.

MONROE.

This mine is southeast from Dun Glen about a mile, near the summit of cone-shaped hill. A series of veins are claimed. They have a northeast a southwest course, and are opened for about two hundred and thirty feet by su face excavations. One of the principal veins is about eighteen inches in width, well defined, and dips to the east at an angle of about sixty-five degrees. Thei are two or three shafts of various depths. The ore is refractory, but yields fair return when carefully reduced. It contains free gold and sulphurets of si ver. The country rock is metamorphic.

ESSEX.

This mine is about one mile northwest from Dun Glen, near the summit the range. A tunnel from the side of the hill, below the croppings, cuts the ve in about 1,100 feet. A drift then follows it northward, two hundred and sixt feet. An air-shaft connects with the surface above in one hundred and forty-fiv feet, and a shaft follows the ledge to the depth of ninety-five feet. Its averag width is eight inches. The country rock is finely laminated slate. The wal are well defined. The dip of the vein is fifty degrees to the west. The silv is in the form of chlorides and sulphurets, the latter predominating. The o produces about fifty dollars per ton.

OPHIR.

This claim is on a vein in the vicinity of the Essex. It is worked through tunnel two hundred and fourteen feet in length. A drift follows the ledge abo two hundred feet. The air-shaft reaches the surface in about sixty feet. shaft follows the ledge seventy feet below the tunnel. The vein is two feet i width. Three distinct faults occur in it. In each instance the vein is parted b dykes of slate. The walls are lined with clay selvages, and the country rock finely laminated slate, interstratified with clay. The ore contains chloride an sulphurets of silver, the sulphurets predominating. There is a small quantity lead.

ESSEX AND EMPIRE MILL.

The companies which have the Essex and Ophir mines own this mill jointl It has ten stamps, with furnaces, pans, and settlers to match. Sage is used f fuel, and the quantity consumed in twenty-four hours costs about fifteen dollar

COUNTRY BETWEEN SIERRA AND GOLD RUN DISTRICTS.

The valley east of the Dun Glen Range varies greatly in width. The nort part of it is six or seven miles wide. Further south it becomes quite narro and the debris extends from the center, probably a third of the way up the hil on either side, giving the valley a trough-like appearance. There is some moi land which produces a coarse grass. Generally there is alkali in quantities su ficient to prevent cultivation. The bunch grass in places extends into the valle There are a number of hot springs on the east side, accompanied with the usu deposits, and emitting considerable quantities of steam and gas. The highe temperature noticed in any of these springs was one hundred and eighty-on degrees. They flow from the base of a low hill, and are surrounded with a fe acres of wire grass. Just north of these springs is a wide, easy pass through th next range east, known as the Bardmass Pass. It is through an open cañon line with a strip of exceedingly fertile land, which produces annually a large yield wheat, potatoes, and hay.

Generally, it may be remarked that a dark quartzite forms the characteristi rock of the whole northern portion of this mountain, which is known as the Franklin Range. The lower hills are smooth and rounded, but near the summit the quartzite crops out and forms bare precipices hundreds of feet in hight. It is often piled in immense masses along the sides of the hills and in the cañons. The highest peak has an altitude of about 8,799 feet, and is seemingly all quartzite. This rock projects from the summit, is scattered in loose fragments down the sides, and covers acres about the base of the peak.

There is not much wood in this mountain, nor is the bunch grass so abundant as it was in the Dun Glen Range. There is good water, but not in large quantities.

GOLD RUN DISTRICT.

This district was organized in October, 1866, and includes the north end of Franklin Mountain. The mines are on the eastern slope, on what seems to be the various outcroppings of a single ledge, including its spurs. Until greater developments are made, this cannot certainly be determined. Should it prove to be a fact, the vein extends due north and south between three and four miles.

Cumberland, the business center, contains a few families and about sixty inhabitants. It occupies a rather elevated and pleasant site, and is well supplied with pure water.

GOLCONDA.

Located in October, 1866; 2,000 feet claimed. This mine was first opened by an excavation on the surface, sixty feet in length, twenty in width, and fifteen in depth. The vein dips twenty-five degrees west, and is seven feet wide. Further south a shaft intersects the ledge at the depth of ninety feet, which is explored by a tunnel one hundred and twenty feet. At a third point, an incline is run on the ledge, and one hundred feet of drifting is done. The walls are not regular in every opening, but the vein is generally filled with mineral, which, when reduced by ordinary mill process, yields less than forty dollars per ton in silver. There is a large per cent. of lead.

CUMBERLAND.

This mine is south of the Golconda, about a mile. In was located in April, 1867. The claim covers 1,200 feet. The vein matter is about seven feet in width. The ore-seam is between three and four feet wide. The dip is west thirty-five degrees. A tunnel follows the ledge sixty feet. The walls have a lining of yellow clay. The ore contains chlorides and sulphurets of silver, but has not been reduced.

REGISTER.

Located in March, 1867; 6,000 feet claimed. A tunnel intersects the ledge at a distance of forty-six feet. The ore is chloride and sulphurets.

BRICK POMEROY.

Located October 11th, 1867; 1,400 feet in the claim. The vein is two feet in width. In every other respect it closely resémbles the Cumberland.

HOME TICKET.

Located July, 1867; 1,800 feet claimed. This mine is about two miles south of the Register. The vein is about fifteen inches in width. Dips west twenty-five degrees. It is uncovered in three or four places, and shows well in every opening.

ADMIRAL.

West of the Brick Pomeroy seven or eight hundred feet. Located Octob 14th, 1867; one thousand feet claimed; vein matter three feet in width. Di west 25°.

GOLCONDA MILL.

Has eight stamps, eight pans, and five settlers. The sage is used for fuel. is collected by Indians, at a cost of about $4.00 per day.

COUNTRY BETWEEN GOLD RUN AND BATTLE MOUNTAIN DISTRICT.

The valley east of Franklin Mountain is about ten miles in width, and drained by a small stream running north, towards the Humboldt. There is som land susceptible of cultivation. The next range of mountains east is compose of granite, with outcrops of quartzite. The highest peak has an elevation about 7,538 feet. South of this peak, about twenty-five miles, there is a wid pass, with a grade not very difficult. On the summit of this grade there is spring, which discharges a large quantity of excellent water. Immediately sout of this point, the prevailing rock is limestone, and the mountain is covered wit bunch grass. The juniper grows in places on the hill sides, but wood is no abundant. The valley east of this is very dry, and descends towards the sout A low saddle connects the mountains north of it.

The Battle Mountains, east of this valley, are not more thirty or thirty-fiv miles in length. They are separated from Fish Creek Mountains on the sout by an arm of the plain, several miles in width, connecting with Reese Rive Valley. Towards the north these mountains are broken by long wide cañon on the west of the summit, which abound in bunch grass, and have a few cotton wood trees along the margin of the streams. These streams are small, but ar fed by never failing springs.

A coarse sandstone, dipping gently toward the west, crops out on the summit near the north end of the mountain. Limestone containing fossils overlaps thi further south. On the eastern slope the limestone is broken, and quartzite of peculiar dark brittle appearance abounds. It is almost obsidian.

BATTLE MOUNTAIN DISTRICT.

This district was organized early in the spring of 1867. It has but a limite supply of wood, but is within six or eight miles of the rail road, by which mean it will obtain supplies of every character. Discoveries of silver-bearing quart were originally made in the fall of 1866, but did not awaken attention until th following spring.

LITTLE GIANT

This mine was located in June, 1867. One thousand four hundred feet ar claimed. The ledge crops out on the surface about eight hundred feet, nearl due north and south across the summit of a cone-shaped hill. Its width is abou seven feet. Dip, 40° west. Thirty feet below the surface a tunnel follows th ledge twenty-five feet. The walls are well defined. The country rock is slat and quartzite. The ore contains chloride of silver, and has produced over $25 per ton. This mine is finely situated, and is tracable down the hill for som distance.

BUENA VISTA SERIES.

This claim was located in June 1867, and contains one thousand four hundre feet on each ledge. Ledge No. 1 crops out about eight hundred feet due nort and south. The vein has a width of from four to six feet. Dips 45° west. The ore contains chloride of silver, and yields one hundred and thirty dollars per ton. No. 2 is very similar in every respect to No. 1, and is about thirty feet to the west. No. 3 is not opened, but shows on the surface, and is thirty-five feet west of No. 2, and dips slightly east. These veins no doubt unite at no great depth. The country rock is dark, glassy quartzite, and seems to compose the hill.

COPPER.

Nearly a mile north-east of the Little Giant, on another spur, there is a belt of copper veins, cropping out in several places, and varying in richness. They all produce red and black sulphurets, with some native copper, and traces of silver. A mile, or nearly so, south-east of the Buena Vista Series, there is a second copper belt. It varies in width from two to three hundred yards, and can be traced northward about a mile. Very little work has been done. Red and black sulphurets abound, and much of the ore will yield from fifty to seventy-five per cent. These mines are very extensive, and may prove valuable.

REESE RIVER VALLEY.

The valley east of Battle Mountain is about fifteen miles in width. Reese River spreads over it, through several small channels, and forms quite an extent of marshy land, almost an alkali flat. It is fertile only in a few places.

The mountains east of this valley are known as the Shoshone Range. The northern section is high and bold, and presents sharp cañons, and short, abrupt spurs. There is some grass land in places along the river.

Fish Creek Mountains are composed almost entirely of rhyolite. They are low, round, and sometimes capped with basalt. Bunch grass is abundant, but wood and water are scarce. In the valley opposite these mountains, there are a number of warm springs, the highest temperature noticed is about 140°. The deposit of silicious matter is extensive, and immediately about the springs is in the form of large bowls, elevated from three to six feet, and sometimes twelve or fifteen feet in diameter. There are bare alkaline spots in the vicinity.

North-east of these springs there is some nut pine on the slope of the mountains. A few miles further south Reese River passes through the Shoshone range from the south-east. The cañon is smooth, and sufficiently wide for a road of almost any character. On the south of the cañon gray rhyolite appears, while on the opposite side the rock is dark quartzite, similar to that noticed in Battle Mountain. The rhyolite is the prevailing rock to within eight or ten miles north of Austin, where it gives place to granite.

LANDER COUNTY.

This county embraces about one-fourth of the entire area of the State. The valley of the Humboldt, and the bottom lands of its tributaries, afford fine native meadows, and a fair proportion of agricultural lands. In places, fine crops of grain are annually produced. The mountains are better covered with timber than those which lie further west. In addition to the juniper, the nut pine, and the mahogany, there are some white pine groves of great value for mining and building purposes. Different varieties of the wild grasses grow to the greatest perfection, and afford fine opportunities for grazing. Several of the mountain ranges are very elevated, and are covered most of the year with snow, which affords a supply of water in favored districts during the prevalence of the dry season.

The popular vote of this county is, according to the official returns, 1,993.

Austin, the county seat, is situated on the western slope of the Toiyabe range, in Reese River district. It numbers about 3,000 inhabitants. The Methodists and Catholics have good houses of worship. There is a good public school, a Court House, a City Hall, Masonic and Odd Fellows Hall, two banks, express offices and other public buildings.

Treasure City is situated nearly on the summit of Treasure Hill, in White Pine district. It is a new place, built amid the excitement incident to the opening of the mines, in that vicinity. It is supposed to have about 2,500 inhabitants, but the population is unsettled, and changing every week. There are two express offices and a bank.

Hamilton is two miles north, and slightly west, from Treasure City. This village is also new, but growing rapidly. It has a population of about 1,000.

Silver Springs is situated two miles south-east from Treasure City, and has about eight hundred inhabitants, and is improving rapidly.

Egan Village, in Egan Cañon, is a small hamlet, the business centre of the district.

CORTEZ DISTRICT.

This district is about seventy-five miles north, and a little east of Austin. The mines were discovered by Mr. A. Veach, and the district organized in March, 1863. The ledges crop above the surface for hundreds of feet on Mount Tenabo. This is the Indian term for Lookout Mountain. It is a very bold peak, having an altitude of about eight thousand five hundred feet. The whole mountain is covered with nut pine. There is also a sufficiency of water.

CORTEZ GIANT.

Located in March, 1863, on the crest of a high bluff of metamorphosed limestone. Much of the vein is exposed. The claim covers four thousand feet. The ore is chloride, and yields eighty-five dollars per ton. The base metals are lead and antimony, in small quantities.

ST. LOUIS.

There are two thousand feet in this claim. A tunnel runs from the side of the hill through vein matter for one hundred and fifty feet. The ore produces on an average one hundred and fifty dollars per ton; some of it yields as high as five hundred dollars per ton. It is somewhat difficult to determine the width of the vein with certainty, but vein matter appears for one hundred and fifty feet or more. It is probable that the ore is in seams. Further developements will determine.

Mount Tenabo mill has thirteen stamps, six Varney pans, and three settlers, and has capacity to reduce twelve tons of ore in twenty-four hours. There are a great number of claims in this district, many of which will in time, no doubt, prove valuable. But at present they are not opened.

REESE RIVER DISTRICT.

Granite is the prevailing geological formation. Basalt and trachyte crop out in a few places, but granite predominates, and extends east and south beyond the boundaries of the district. More bullion has been shipped from these mines this year than ever before, in the same length of time. Generally the ledges crop out on the surface, and dip with the granite about 30° east. They lie in waves, in almost every direction, and have a width of from a few inches to four feet. The walls are usually lined with a dark blue clay, and about this lining there are thin layers of decomposed granite and quartz. The true vein-rock is hard, but varies much in different localities. The chloride ore next the surface gives place to sulphurets at the depth of from forty to one hundred feet—the general water level. The base metals are lead, iron and antimony, but not in quantities sufficient to render the reduction of the ore difficult.

There has been a great amount of work done under ground within the last two years. Full descriptions would only encumber this report. That which is not necessary to a correct understanding of the present character and condition of the mines, is omitted.

NORTH STAR, (MANHATTAN COMPANY).

Located in October, 1862, by John Frost & Co.; course due north; dip 30° east; depth of main shaft, three hundred and eighteen feet. There are three drifts towards the north, and a great amount of stoping is down. The third and lowest drift is from the bottom of the shaft three hundred and twenty-six feet northward to the vein. The vein is stoped out fifty feet high for six hundred feet. The vein matter is from six to ten feet in width. The ore is found in seams and chambers, and has yielded about $250 per ton. The mine looks well at every point through the different levels. It is well timbered. The hoisting is done by a steam engine of thirty horse-power.

SOUTH AMERICAN.

Located March 7th, 1863. Eight hundred feet claimed. Course, north 32° west. The dip varies from 32° to 60° east. The surface width of vein matter is two and one-half feet. The depth of the main shaft is three hundred and sixteen feet. It is eighty feet to the water level, through chloride ore all the way.

The first level, one hundred and sixty feet below the surface, runs west one hundred and eighty-four feet on the vein, which is from two inches to two feet wide, and at the end of the level is broken by a wall of granite. A chamber is stoped out above forty by sixty feet; also a level runs east from the main shaft thirty feet. The ore is stoped up twenty-five feet, where the ledge is cut off by a slide of granite.

The second level runs north from the main shaft one hundred and fifteen feet at a depth of two hundred and ten feet, without finding the vein.

The third level leaves the main shaft at the depth of three hundred and ten feet, and runs south one hundred and forty-five feet. A well-defined ledge appears from four inches to five feet in width. From the same depth a level runs west three hundred and twenty-eight feet. Seventy-five feet of the distance it is on the vein. A chamber is stoped out thirty-five feet high, and about the same in length. The ore varies in richness. Where the vein is less than two feet wide it is full of mineral—where it is wider it is of less value. The base metals are lead, iron, zinc, arsenic, and antimony, in small quantities, which do not hinder working.

FLORIDA.

Located in June, 1863. There are eight hundred feet in the claim. The width of vein is ten inches. Dip 28° northeast. Depth of incline, five hundred and twenty feet, a true grade all the way on the ledge.

The first level, one hundred and fifty feet from surface, runs northwest on the ledge eighty feet. A chamber is stoped out thirty-five feet high and sixty feet long. The water level is one hundred and forty feet below the surface. A fine belt of chloride ore was found about fifty feet from the surface. It continued about twenty feet. The vein was barren for fifty feet from where the chloride ore gave out.

The second level is at the depth of two hundred feet. It follows the vein one hundred feet northwest from the incline and two hundred and forty feet southeast.

On the northwest the ledge is stoped eighty feet along the level and fifty feet above it. On the southeast a chamber is stoped out one hundred feet in length and sixty feet in height. It yielded $150,000. At the depth of three hundred feet a level runs northeast and southwest from the incline, and much stoping is done. One hundred thousand dollars was the product of this level. At the depth of four hundred feet a level runs westward from the incline thirty feet. On the east it runs one hundred feet, and is stoped irregularly. The ledge is about fourteen inches wide, and very rich. At a point one hundred feet from the incline, on the level at the depth of four hundred feet, a drift runs south one hundred feet without finding good ore. At the depth of four hundred feet on the incline another level runs north three hundred and seventy-two feet, without making important discoveries. At the depth of five hundred feet a level runs east on the vein ninety feet. The vein is considerably broken. A chamber is stoped out sixty-five feet high, leaving a section thirty-five feet in length on the level without working. The ore in this mine averages about three hundred dollars per ton.

The base metals are lead, iron, copper, and arsenic in small quantities; antimony is more abundant than either of the former. The granite is generally very hard; in a few places it is soft and decomposed.

NORTH STAR—FIRST WESTERLY EXTENSION.

Located in the spring of 1863. One thousand feet claimed. Course, northwest and southeast. Dip 20° northeast. The surface width of vein is eight inches. The depth of incline on the ledge is six hundred and fifty feet. The walls are well defined, with clay selvages. At the depth of five hundred feet a level runs north two hundred and eighty feet, and is expected to connect with the Lane & Fuller shaft in about two hundred feet further.

The Company which commenced this shaft, and the North Star Gold and Silver Mining Company, have recently been consolidated, and the North Star Mine will eventually be worked advantageously through this shaft. It now has a depth of four hundred and six feet. It is estimated that it will intersect the ledge at the depth of four hundred and fifty feet.

In sinking this shaft three or four ledges were found. One or two are being worked which promise well. The shaft has been sunk all the way through granite. In places this rock is soft and decomposed, but generally it is very hard. It dips northeast 35°. Several faults have been found. At the lowest, the dip of the granite changes to the southwest 40°.

The elevation of the mouth of the shaft is nine hundred and eighty-seven feet above the mouth of the incline of the North Star.

The water was somewhat troublesome at the depth of two hundred feet, but decreased perceptibly at the depth of four hundred feet.

The ore taken from this mine, (North Star) as reported by the Superintendent, has yielded as high as $483.08 per ton. One hundred tons yielded $41,061.80. Deducting $4,500.00 for reducing, there remained $36,561.80 for the Company. In August twenty tons of selected ore yielded $2,759.03 per ton.

The base metals are galena, iron, zinc, copper, arsenic, and antimony, but not in quantities to render reducing difficult. Timbering is necessary only in breasting.

MAGNOLIA.

Located in June, 1863. Six hundred feet claimed. Only four hundred and twenty feet incorporated. Course of ledge, north 42° degrees west. Surface width twelve inches. Dip northeast, varying from 26.5° to 38.5°. The country rock is very greatly disturbed and broken.

The depth of incline on ledge, four hundred feet. The grade is regular.

Sixty-six feet from the surface the first level is run thirty-two feet nearly west and stoped thirty feet above. This level extends one hundred and fifteen feet on the east side of the incline, at the end of which a triangular section is stoped out for ninety feet back towards the incline.

Here the chlorides disappear, and sulphurets prevail. A break also occurs at this point from an intruded mass of decomposed quartz, seemingly having been ground to a powder, blackened with oxide of iron, and hardened to a firm, stiff clay. The second level, at the depth of one hundred and twenty-three feet, runs on the ledge 39 feet west of the incline, where there is another break. The ore is stoped back to the incline twenty feet high. It is worth $200 per ton.

On the east side of the incline the level runs seventy feet all the way in the break without ore. At the depth of two hundred and sixty-eight feet the third level runs west on the vein one hundred and twenty feet, also east of the incline ninety feet. The ore is stoped out irregularly to the level above, one hundred and forty-five feet, or the whole length of the level. The vein increases slightly in width and richness. The ore averages $300 per ton. At the depth of two hundred and seventy-five feet another break occurs. The ore is all extracted to this break from the level above.

At the depth of thirty-five feet from the mouth of the incline there is a change in the dip of the ledge. It is also split or divided longitudinally; the part set off is at first about two inches in thickness, but maintains the dip of the vein at the surface. It is reached from the first main level by a cross-cut about thirty feet above the main ledge. It is very rich, but is only three or four inches in thickness. It is intersected again from the second level by a cross-cut at the distance of forty feet, where it is eighteen inches wide, but not so rich as it was above, and not so rich as the primary vein.

At this point it was opened for ninety feet to the west by a drift, and was found to vary in width and richness. A level from the cross-cut connects with the works in the Florida Mine, in sixty feet. The main incline continues one hundred and twenty-five feet below the third level on the principal ledge, which dips 45° east, but produces only low grade ore. From the bottom of this incline a fourth level is just commenced.

SARATOGA.

Located March 14, 1863; 1,200 feet claimed; course northwest and southeast; dip, east, 35°; width of ledge at the surface, twelve inches; opened by an incline ninety feet in depth.

GRASS VALLEY SALT MARSH

Is situated about thirty-five miles northeast of Austin. It produces from twelve to fifteen tons of good salt per day, which is about eighty-five per cent. pure. The marsh covers six hundred and forty acres. The efflorescence varies from one-eighth of an inch to an inch in thickness. It is estimated that eight hundred tons of salt may be obtained in a single season. This marsh is about one hundred miles northwest from White Pine District.

MANHATTAN MILL

Has twenty stamps, each weighing seven hundred and fifty pounds, fourteen Wheeler pans, ten roasting furnaces, six settlers, a Gardner's crusher. Capacity of the mill, nineteen tons in twenty-four hours, in which time it consumes fifteen cords of nut-pine wood, at a cost of nine dollars and fifty cents per cord. Four hundred and fifty bushels of charcoal, at a cost of thirty cents per bushel, are consumed per month. Twenty-five men are employed in running the mill. In amalgamating, ninety per cent. of the metal is saved.

There are a number of other productive mines in this district.

SMOKY VALLEY AND COUNTRY TO NEWARK.

Smoky Valley, east of the Toiyabe Range, does not contain much fertile land. It inclines south, the northern end being surrounded by a rim of low mountains.

Where the overland road crosses the first range east of Smoky Valley, basaltic rocks occur; only a few miles north rhyolite composes the hills and the mountains. Some of the outcroppings are beautiful, exhibiting a great variety of form and color.

A plain stretches eastward for thirty or forty miles. The soil is barren of almost everything but sage. This valley—or perhaps, more properly, table-land—occupies a break in the range of mountains running north. On the spurs and foot-hills south the nut-pine and juniper are abundant. The third range from Austin extends east of this opening, but is broken by a fine natural pass at Twin Springs. Quite a large quantity of water rises at this place, flows eastward, and sinks in the next valley. A fine native meadow surrounds the springs. The hills on either side of this pass are limestone, dipping east forty degrees. I discovered fossils in this rock, among which are the ammonite and spirifer.

The valley east of this range is a sage plain eight or nine miles wide, declining north. To the south it is interrupted by low hills curving eastward, connecting with the Diamond Mountains. This range is crossed through Trefren's Pass, a cañon of easy ascents, lined with narrow strips of fertile land for several miles, and well supplied with fine living water.

The first quality of bunch grass grows most luxuriantly on the hills, and upon the summit of the main trunk of the mountain.

Nut-pine and mahogany have, also, a thrifty growth.

Basalt, quartzite, slates, and limestone (with fossils) crop out in places. On the eastern slope there is a mass of red quartzite. It is very hard and highly colored, probably with oxide of iron.

The timber extends down into the next valley east, a little south of the road. Seven miles north of the pass, the Newark District is situated.

The Diamond Mountain is a splendid range. The section north of Newark has some bold peaks, probably equaling in height any east of Star within the boundaries of the State. The southern part of the mountain is not so elevated, nor so well covered with grass and timber.

A few miles north of Trefren's Pass the summit is close to the east side of the range. It breaks off precipitously. The capping and the substance of this section, for a mile in width, and six or eight in length, is stratified limestone. On the west a short distance, quartzite and slate prevail, and the spurs and cañons slope gradually for several miles to the valley, and are well timbered.

On the east the cañons are like great fissures chopping into the mountain. They are short, deep, and sharp. The intervening points, or rather sides, of the summit are rough with projecting crags.

NEWARK DISTRICT.

This district was organized in October, 1866, and extends several miles north and south, including the most precipitous part of this section of the mountain.

It is probable that developments may prove in time that there is but one ledge, and that mines which now seem to be on separate ledges may be on spurs or parallel outcroppings of the same ledge, as has frequently occurred in other districts. Regarding it thus, the ledge crops out in places near the summit on the face of the hill, where it is almost inaccessible for more than a mile. It is represented as standing thirty feet above the surface for three hundred feet. Its average width is six feet. The country rock dips west twenty-five degrees. The ledge dips eighty-five degrees west, slightly south. Its course is north, a point or two west. It is exposed on the sides of deep cañons for hundreds of feet below its highest croppings.

CHIHUAHUA,

Located by S. N. Beard and others, in November, 1866. One thousand six hundred feet are claimed. The south extension, located at the same time, and by the same party, has 1,400 feet. One company owns both claims.

The Chihuahua is opened from both sides of a very deep and narrow cañon, cutting it at right angles to a depth of four hundred feet. In the bottom of this cañon a shaft is sunk to the depth of eighty feet. It is expected that it will intersect the ledge at the depth of four hundred feet from the point of commencement. From the depth of seventy-five feet in this shaft a level is run to the ledge, but it is not yet opened. From a point level with the mouth of this shaft a tunnel is run on the ledge north three hundred and fifty feet. It passes through vein matter about twelve feet in width. For a short distance the west wall is well defined, but it becomes irregular and broken. At first there seems to be no wall on the east, or at least it is very imperfect, but gradually becomes distinct and definite. About fifty feet from the mouth of the tunnel, the ledge is split. A part turns westward, and is about two feet in width; it preserves the dip of the main ledge. Further north the remaining part of the ledge also turns toward the west, leaving a continuation of vein matter and barren quartz next the east wall. Some stoping is done along this tunnel, and the pay ore is in small chambers.

Seventy-five feet above this on the hillside another tunnel runs one hundred and fifty feet on the ledge, which exhibits the same characteristics of form as below, with greater irregularities, showing a more violent disturbance.

Another tunnel still higher up the hill is just started, but the ledge is not sufficiently explored to form a correct estimate of its character at this point. The ore extracted yields about one hundred dollars per ton. About $60,000 have been taken from the mine.

LINCOLN AND WASHINGTON.

Apparently two parallel veins cropping out about two hundred feet west of the Chihuahua, and located at the same time and by the same parties. These veins dip west forty-five degrees, and are each about two feet wide.

The Lincoln is opened with a tunnel one hundred and twenty-five feet in length. The ore is the same in character in every respect with the ore of the Chihuahua.

BUCKEYE.

Located at the same time and by the same party, and is about fifty feet east of the Chihuahua. The vein is mixed with limestone and is not opened.

CENTENARY SILVER MINING COMPANY'S MILL.

Erected in 1867; has twenty stamps, eight roasting furnaces, ten Greeley's and Wheeler's pans. Engine, one hundred-horse power. There are two large tubular boilers. All necessary offices and shops are connected with the mill. The work has been well done, and the mill is complete in every respect.

Nut-pine and juniper are used as fuel, at a cost of six dollars per cord. Eighteen tons of ore are reduced in twenty-four hours.

EUREKA DISTRICT.

This district was organized southwest from Newark a few miles several years ago, and a large number of claims were located, but as yet no marked developments have been made to determine certainly the value of the mines. The ore, so far as extracted, contains large quantities of galena.

Very recently the erection of smelting works was commenced, but they are not yet completed. Discoveries made within a few weeks justify the belief that this will prove a rich mineral bearing district.

COUNTRY FROM NEWARK TO WHITE PINE.

Newark Valley, east of Diamond Mountain is about fifteen miles wide. Several miles north of Newark there is an alkali flat, and within six miles of the Centenary Mill there is a salt marsh covering about one hundred acres.

The water is very impure, containing earths and only about twenty per cent. of salt.

Hot springs occur along this valley, at intervals of from ten to twenty miles. In places they discharge large quantities of boiling water. There is not much fertile land.

THE PANCAKE MOUNTAINS

Are about ten miles southeast from Newark. They are low hills, continuing south as a range for a long distance. The valley circles around them to the north and east. The northwest foot-hills are rhyolite in different colored masses. The eastern part of the mountains is limestone, and near where the formations meet there is a small spring.

WHITE PINE MOUNTAINS.

To the north this mountain extends nearly to the Humboldt River in broken ections, at places rising to a considerable altitude. Within twenty-five or thirty miles of the mines the range consists of a series of short, smooth hills, lying diagonally across it in a southeast and northwest direction, and nearly destitute of timber. The supply of water is not abundant. Just east of Pancake Mountain these hills are more isolated, change their course by degrees to due north, are more regular in form, rise to a much greater altitude, and are thickly covered with juniper, nut-pine, mountain mahogany, and an inferior growth of white pine.

South of this for ten or twelve miles the mountain is very broken and somewhat depressed. All the loftier sections are covered with timber and with a profusion of bunch grass, and are quite well supplied with water. This is the general character of the range as far as it has been explored.

WHITE PINE DISTRICT.

In the spring of 1865, a company from Austin went eastward for the purpose of exploring the country, a little south of where Newark is situated. From some points on the Diamond range, their attention was directed to a very high and regularly formed mountain, east of the Pancake range. They approached it through what is now known as Mohawk Canon, near the head of which they discovered the first evidences of the existence of silver mines. A district was organised on the 15th of July and called White Pine District, from the fact that white [illegible] in the cañon. This mountain, or hill, has an elevation of [illegible]—others estimate it much higher. Its course is due north and south, and its length about twelve miles. Its contour is a finely drawn curve, quite regular, terminating a little abruptly at the north end. The summit is thin and blade-like in shape. The base is not broad. The spurs and cañons run at right angles with the summit, are short and sharp, but not usually precipitous. Perhaps, on the eastern slope, they tend southward somewhat, before reaching a smooth open canon, running south and southwest, connecting with the plain in that direction. Towards the north this canon is divided by what is known as Middle Hill, two or three miles in length, having a course north of northwest, and an altitude of about 1,200 feet less than that of White Pine Hill. To the east of this is Treasure Hill. Its course is northeast and southwest. On the west the spurs are quite abrupt, near the cañon, but rise more gradually afterwards. Where they connect, the ascent for two or three hundred yards is quite gentle, then it increases rapidly to the summit, which is about a mile in length, and precipitous for two or three hundred feet on the east side, and at either end. To the north it terminates at the highest point in a kind of elongated peak, which has an altitude of about 7,000 or 7,500 feet. South of this, a few hundred feet, there is a depression for a short distance of from one hundred and fifty to two hundred feet, and then there is a second rise of fifty or a hundred feet for several hundred yards, to the termination of the summit. The hill south of this is a series of spurs, divided by sharp cañons. These spurs slope towards the southeast, south, and southwest, from two to three miles. Below the precipitous part of the hill, east of the summit, the descent is at an angle of about 35° for two or three hundred yards, where it again becomes almost precipitous for several hundred feet, to a very broad canon, or narrow valley. This cañon sweeps around the spurs of the hill, south and southwest, and unites with the cañon from Middle Hill. It also circles around all three of the hills on the north, connects with the canons on either side of Middle Hill, and finally opens out into Newark Valley. The flow of the water in these cañons is determined by slight elevations or saddles, connecting Middle Hill with the other hills at the north, and Treasure Hill with Fossil Hill, a little east of Hamilton. These elevations are so slight that they cause no obstructions to the roads which are made along these natural passes, and a carriage may be driven around either one or all of these hills. In these cañons there are a number of springs of good water, a little hard. The supply is sufficient for quite a number of mills, and may be greatly increased by short tunnels. Several springs are near the heads of the canons on White Pine Hill, but there is no water found either on Middle Hill or Treasure Hill.

The geological formations are essentially the same in every part of the district. Belts of argilacious slates, extensive croppings of quartzite, heavily covered with oxidized iron and heavy croppings of limestone, constitute the prevailing rocks. On the western slope of White Pine Hill it is said that granite appears. The mines originally discovered are north of this, where the limestone prevails. Quartzite crops out on the summit in many places.

Middle Hill is a mass of limestone, underlaid apparently with slate. Sections of this rock lie against every side of Treasure Hill; often triangular in shape, and hundreds of feet in length, height and thickness. They overlap the spurs or rest against them without regularity or connection. They are found transversely on the southern portion of the summit. Their disjointed edges and tilted strata make all the precipices. A belt of slate two or three hundred feet wide, appears northwest of the north end of the summit down towards the cañon, and is wound like a sheet up the side of the hill, south and east nearly half way around the highest point. This point is an extensive outcrop of very hard quartzite. It projects fifty or sixty feet, and great masses have fallen and lie in loose boulders below. Fossils are found in great abundance in the limestone. Encimites, corals, terebratulas and spirifers occur.

Fossil Hill, next north of Treasure Hill, is covered wtih a great variety of fossils.

The discoveries made in 1865, were not followed with a rapid development of the mineral resources of the district. The ore was of too low a grade to pay largely. It was reduced under great disadvantages at Austin. It contained copper, iron, lead and antimony, and yielded from seventy to one hundred and fifty dollars per ton in silver.

A few miners, however, remained in the district. They affirm that in the early part of the following winter they experienced a severe earthquake. There were several shocks—three much harder than the others.

In the spring of 1866, mines were discovered on the eastern slope of White Pine Hill. It is thought that there are several ledges extending along the mountain from near the summit, far down the foot-hills. The ore contains large quantities of base metals, and without being tested, was condemned as refractory.

Late in the fall of 1867, an Indian found a fine specimen of chloride ore on Treasure Hill, near what is now called the Hidden Treasure Mine. He conducted the miners to the place, and other discoveries followed in rapid succession. In two or three days, however, a deep snow fell, which continued until late in the following spring, and prevented a thorough exploration. It is somewhat singular that experienced prospectors had previously passed over this hill in search of mines, without being successful. The fact is explained when it is known that the float-rock has a very unusual appearance. It is generally dark, with a slight reddish or rusty tinge, sometimes yellow, or even black, and looks much like a specimen of limestone colored with the oxide of iron. It is heavy and compact, and when broken, has a dull, unpromising lustre, very different from that shown by rich quartz generally. As the snow melted away in the spring, hundreds of claims were located; work began in many places; immensely rich deposits of horn silver were found, and the deepest interest was awakened.

Commencing at the point of discovery on the summit, a deposit of ore is traced on the surface due south 1,200 feet, where it disappears under a capping of limestone for several thousand feet, and reappears on the brow of the southern slope of the hill. It is traced on the surface at this place nearly two thousand feet. It disappears again, but is found further south in several places. It varies little from a direct line at any point. Discoveries are also made on the eastern slope of the hill, a few hundred feet below the summit, in a line due north and south. Further to the westward, down among the foot-hills, many locations have been made which promise well. Rich mines are being opened on the northwestern slope, and in various places on the spurs south and southwest. Some of the richest discoveries are in an eastern and western direction, a little below the break of the southern end of the summit. The Eberhardt is in this neighborhood. Croppings and deposits of fine chloride ore are found, and slightly opened in different places, running north and south diagonally across Middle Hill. As a whole, this mineral belt is crescent-shaped, the northern and southern extremities bearing strongly towards the west. It is between six and seven miles in length, and about one and a half in width.

The number of truly valuable mines cannot now be ascertained. Usually the openings on different claims extend but a few feet. The deepest shafts are about one hundred and twenty-five feet below the surface, and only one or two have attained that depth. The distinguishing characteristics are their extent and productiveness, the wonderful richness of the ore, its uniform freedom from base metals, and the ease with which it is taken out and reduced. In a few places there is a trace of lead, and a glance of copper. Small quantities of iron are found everywhere, but this is all. The silver is in the form of chlorides. Very careful assays show a small per cent. of gold. Horn silver is not found alone in scales and thin linings, but massive, in specimens weighing between fifty and a hundred pounds, nearly solid, with only quartz sufficient to give it body and consistence.

In regard to the permanency of these mines it is impossible to decide with absolute certainty. The general impression is, that there are no well defined walls; that the ore is much broken and is found in masses or beds, rather than in veins; that they have no regular dips, and sometimes it is even difficult to determine their course.

Such views are formed without consideration, and in the face of many facts to the contrary. No mine can truly be said to be opened so as to show its real characteristics, until it has been examined below the disturbed country rock, and usually below the water level. Not a mine in the district has been thus examined. Were they mere deposits—ore beds—it would seem that some of them, when hundreds are being worked, would have exhibited the fact by becoming exhausted. But thus far not one has failed; on the contrary, the Hidden Treasure, the Eberhardt, the Emersley, the Pocotillo, and the Hidden Treasure South and several others, show well defined walls, with clay selvages on one or both sides and in different places. In both the Aurora South and North, transverse excavations for fifty feet have been made at intervals for more than 1,200 feet in a direct line, to the depth of twenty-five or thirty feet; and, although no walls have been found yet the facts stated lead fairly to the inference that there must be a ledge below.

But should this inference be incorrect, and should there be no ledge, it would be a new experience in the history of mining developments. Still, the quantity of ore prospected as described, and paying, as it does, an average $185 per ton, renders this a mine of great value, and to be preferred to one of equal productiveness between walls of granite or of porphyry. But that this should be the case, that there should be a deposit of ore so uniform in richness, so regular in its course for 1,200 feet, situated only a few rods from the summit of a high, isolated mountain, is very improbable, and has not occurred before in any district in the State.

When the mines are opened below the disturbed rock, the true idea of this wonderful mineral belt, known as the Treasure Hill belt, will be known, but probably not before.

HIDDEN TREASURE.

This claim was located November 3d, 1867, and contains one thousand feet. The width varies from two to eight feet. The ledge has been opened through nearly the whole length of the claim in places, and excavations made to the depth of twenty-five feet. Dip west, slightly north, about 25°; walls in places well defined; the east wall is limestone; the west is slate dipping with the ledge. Between three and four hundred tons of the ore have been reduced, and have produced on an average one hundred and sixty dollars per ton. Assorted ore has yielded from five to eight hundred dollars per ton. The silver is in the form of chloride; much of it horn silver; a little iron is the only base metal.

HIDDEN TREASURE SOUTH.

One thousand feet are claimed. This mine is the same in all respects as the Hidden Treasure, except that there is not nearly so much work done.

The quality of the ore is unchanged.

CONTINENTAL.

Located in August, 1868. The original claim, and the extension together have 2,200 feet south, next to the Hidden Treasure South.

Vein matter shows on the surface, and quartz with the chloride of silver shows in an excavation only a few feet in depth, and also in the bottom of a shaft ten feet deep. From the assays, this quartz will probably yield twenty-five or thirty dollars per ton; but it is not opened, only reached at the points indicated, sufficiently to show the continuation of the ledge due south from the Hidden Treasure.

BARRIS AND SPROUL, WARD BEECHER, MONTROSE AND TWILIGHT.

These claims are near each other, and contain about six hundred feet each. The Ward Beecher was located in the fall of 1867. The others in the spring of 1868. They are probably on the same ledge. The working value of the ore is about two hundred dollars per ton.

AURORA NORTH.

Located in the spring of 1868. One thousand feet claimed. The south part of the mine is opened by an excavation east and west, about ten feet in width, twelve in depth, and forty or more in length.

It exposes a large body of chloride ore, yielding from one hundred and fifty-five dollars to two hundred and two dollars per ton; 6,375 lbs, without assorting, yielded $442.86.

AURORA SOUTH.

This mine is the same as the Aurora North in every respect, except that there are a number of excavations running east and west for fifty and sixty feet, and to the depth of from twenty to thirty feet, exposing a great quantity of ore. More than one hundred and fifty tons reduced, yielded an average of one hundred and eighty-five dollars per ton; 17,157 lbs yielded $3,696.56; ninety tons yielded $14,713.50; 30,159 lbs yielded $2,842.48; eight tons at another time yielded $3,500.

KEYSTONE.

This claim is south of the Aurora, about one thousand five hundred feet. Eight hundred feet are claimed; located May 11th, 1868; course east and west. This mine was discovered from a mass of horn silver found on the surface, which yielded about $12,000 per ton. An excavation about thirty feet wide, and fifty feet in length, east and west, opens this mine to the depth of eighteen feet. A shaft from the mouth of this excavation is sunk about one hundred feet through vein matter. Quartz rich in chloride silver abounds along this shaft.

Quantities of ore have been reduced at different mills, and have yielded on an average one thousand dollars per ton. When closely selected it has yielded over one thousand five hundred dollars per ton; eight hundred and fifty tons of ore gave a return of one hundred and eighty dollars per ton. In mining, quantities of chloride silver are shaken loose from the quartz and finely pulverized. It is collected and passed through screens, and yields from one hundred and fifty to several hundred dollars per ton.

EBERHARDT SOUTH.

Located in Decemher, 1867. Eight hundred feet are claimed; course east and west. Like the Keystone, this mine is opened with an excavation from the east side of the hill, about fifty feet in length, forty in width, and twenty in depth. Drifting has been done to various distances westward, without finding the limits of the ore. A shaft south and west of this excavation, probably one hundred feet, known as the Blue Bell Shaft, is sunk to the depth of one hundred feet along the north side of a section of limestone. This wall is quite regular and well defined. About forty feet below the surface, a drift in an irregular direction connects this shaft with the excavation before described. It passes the whole distance (one hundred feet) through a mass of ore of marvellous richness. It is all chloride, principally horn silver. Short tunnels and excavations are made at intervals, to ascertain the extent of this ore, but no limit has as yet been reached. Above, beneath, on the sides, in every little curve and drift throughout the whole extent, the quartz is loaded with yellow, gray or green chloride, or with horn silver. But little of this ore is of low grade; and scarcely a spot of barren quartz is seen.

The following statistics are taken from the mill books, where most of the ore is reduced. This mill, the Oasis, has ten stamps, eight Varney pans, three pans for settling, engine sixty-horse power. The product of eleven days run from October 15th, was $60,919; and of sixteen days run from November 1st, was $82,500. Two hundred and twenty-five tons of ore in the ore-house, (November 16th) was being reduced and yielding, according to the books, from eight hundred to one thousand dollars per ton. One hundred and fifty tons of the first class ore carefully selected, were reduced in the Centenary Mill at Newark, before the Oasis mill was running, and yielded a little above $1,300 per ton. A chimney, or pocket in the mine, yielded $85,000. Specimens usually carried away for cabinets, are fabulously rich. Four and a quarter pounds were reduced and yielded thirty-five dollars and twelve cents. Twenty pounds were reduced in November and yielded one hundred and fifteen dollars and twenty-five cents. The average fineness of all the bullion from this mine, is .975.

BLUE BELL.

This mine joins the Eberhardt on the south, and is similar to it in every essential characteristic. An agreement is made by which the Keystone, the Eberhardt, and the Blue Bell are to be consolidated on the first day of August, 1869. There is no wall or other natural line of division separating them. Together, should they continue to yield as they now promise, they will constitute a mine of almost incredible value. A wall similar to that in the Blue Bell shaft is found on the north side of the excavation in the Keystone, and is exposed in a drift east and west for seventy feet at the bottom of the shaft.

After repeated, careful examinations of all the available facts, it is suggested that these claims may be situated on what is known as a pipe vein, radiated in an eastern and western direction. No conclusion perfectly satisfactory can be reached without further developments.

It is certain that effectual causes have produced at this point a mass of silver ore of unsurpassed richness, and of surprising extent.

SILVER GLANCE.

This claim is on a spur of the hill south of the Eberhardt about three thousand feet, and is five or six hundred feet below it. The course of the mine is northeast and southwest. The ore is found on the surface and needs but little uncovering. There are intruded fragments of limestone, but the ore is obtained without difficulty and yields about one hundred and ten dollars per ton. Very little excavating is done, and yet this mine has produced several thousand dollars.

ARGYLE

Joins the Silver Glance on the southwest. A west wall appears at the surface, and is quite regular for thirty feet—the depth of the shaft. The dip is fifty degrees southeast. It is apparent that there is a great quantity of ore in this mine. It has been reduced, and yields from seventy-five to over two hundred dollars per ton.

A number of claims showing ore, and in promising localities, are situated south and southwest from the Argyle, at distances varying to a mile or more; but they are scarcely opened, and any report made at this time would be unsatisfactory.

NOTE.—The Herman, Mazeppa and California, in this vicinity, have within a few days developed large quantities of very rich ore.

POCOTILLO.

Located in the spring of 1868; 1,000 feet in the claim; course north, slightly west; width about eight feet. An excavation east and west shows a fine body of ore. A shaft is sunk, about fifteen feet in depth, and exposes walls apparently regular. The ore recently taken from the shaft is exceedingly rich and resembles closely the ore of the Eberhardt in character and value. This mine is on the eastern slope of Treasure Hill, about opposite the Aurora North.

EMERSLEY.

This claim is situated on the eastern slope of the hill, northeast of the north end of the Hidden Treasure, and about 1,000 feet below it. Course, southwest and northeast; width varies from six to ten feet; dip, northwest fifty degrees. The east wall is smooth and has a clay selvage. The west wall is irregular, but shows distinctly. Three thousand and seventy-four pounds of ore yielded six hundred and sixty-nine dollars and eighty-one cents.

This mine was located on the fourth of June, 1868. There are several claims both north and south of the Emersley, which show good ore on the surface, but are not opened.

VIRGINIA.

Located in the spring of 1868, on the north end of Treasure Hill; six hundred feet claimed. An excavation is made to the depth of twenty-five or thirty feet, and a quantity of ore obtained which yields from one to two hundred dollars per ton. Sixteen tons averaged two hundred and twenty-six dollars per ton.

South of this mine about 1,500 feet are the Vallejo, C. T. Fay, Echo, Almira, and other mines, showing good ore near the surface.

CHLORIDE FLAT

Is west from the Aurora two or three hundred feet. The hill slopes gently for two hundred yards or more, and is not broken for some distance north by cañons. This space is known as Chloride Flat. It is covered over with claims, and is being perforated in every direction with shafts, tunnels, and drifts. The ore cropped out on the surface, but is found in sheets of every size and thickness, between successive layers of limestone.

Among the most prominent mines in this neighborhood are the Iceberg, Stone Wall, Snow Drop, Post Hole, Genessee, Delmonico, Hemlock, Indiana, Glacier, Wabash, Silver Cloud, Robert Emmet, Excelsior, etc.

On opening these mines, generally, it is found that the ore decreases in quantity and in value in a westerly direction. When followed eastward it is more abundant and of a finer quality. In places it has yielded very large results. The sheets or deposits of ore vary in thickness, and the same sheet will vary greatly in different places. The limestone often shows evidences of having been subjected to heat, being disintegrated and mingled apparently with black volcanic matter. 8,632 pounds of ore from the Glacier produced nine hundred and eighty dollars and four cents. 6,909 pounds from the Snow Drop produced $1,151.28. At another time, 7,662 pounds produced $1,296.05; 25,067 pounds from the Stonewall produced $5,074.82; 6,000 pounds from the Romulus produced $1,445.50, and 2,620 pounds from the Genessee produced one hundred and ninety-nine dollars and sixty-four cents. These statistics are from the records of the mill where the ore was reduced, and might be greatly increased were it necessary.

NORTHERN LIGHT.

This mine is situated on the eastern crest of Middle Hill. It was located in the spring of 1868, and the claim contains eight hundred feet; course, due north and south; dip, thirty degrees west. Several excavations have been made at intervals, across the ledge, and small quantities of ore have been extracted, which assay from forty to between seven and eight hundred dollars per ton.

The walls are limestone, but have not been traced sufficiently to ascertain their peculiarities, if any. A stain of copper is seen in the ore occasionally, and close assays show a small per cent. of gold.

PILOT.

Situated south of the Northern Light. Located September 1st, 1868; 1,200 feet claimed. This mine is on the same ledge with the Northern Light and is in all respects similar. The ore is chloride, and closely resembles the surface ore of the Pocotillo. These mines are finely situated to work.

BASE METAL BELT.

The mines comprising this belt are on the eastern slope of White Pine Hill. They have not been opened, and occupy an area about four miles in length by a mile or a mile and a quarter in width.

The ledges crop out in places and are from two to six feet in width. The ore assays from seventy-five to six hundred dollars in silver. The base metals most abundant are copper, lead, and iron. Traces of antimony have been found, but the ore cannot be called refractory when compared with ores successfully reduced in other parts of Nevada.

WESTERN BELT.

This belt includes the mines first discovered, and which led to the organization of the district. It is on the western slope of White Pine Hill, and has an extent of about six miles in length by one in width. The ledges crop out on the surface and have well defined walls. The ore produces from one to four hundred dollars per ton. It contains the same base metals as the ore in the Base Metal Belt, but not in such quantities. It is not more difficult to reduce than the ore in many of the mines at Austin. All work is suspended in this part of the district for the present.

SMELTING FURNACE.

In addition to the Oasis Mill, described in connection with the Eberhardt Mine, a cupola furnace is in operation at Silver Springs. It has capacity for reducing about twelve tons of ore in twenty-four hours.

WHITE PINE MILL.

This mill has ten stamps, eight pans, and is doing good work. It is at Hamilton.

MONTE CRISTO MILL.

This mill is situated at the base of the spurs southwest of White Pine Hill. It has five stamps, two roasting furnaces, and pans to match. It is a complete little mill and runs well.

EGAN CANON.

The following interesting description of the mines in this neighborhood was prepared by Mr. L. F. Emmons, connected with Mr. King's geological expedition.

EGAN MOUNTAINS.

Where the overland road crosses this range it is divided into two ridges, between which lies a pretty mountain valley surrounded by well wooded hills, easy of access, and in the valley bottom good grass and plentiful springs.

The water from this valley finds an outlet in a northerly and easterly direction through Egan Cañon, at the head of which is situated the town and a five stamp mill. The western ledge is composed of limestone, the eastern of metamorphic rock, principally quartzite, the formation having a north and south direction, (magnetic) and dipping to the westward. At the mouth of Egan Cañon on Steptoe Valley, granite comes up, extending on the north along the lower foot-hills, and on the south further, or rather higher up into the range. Above the granite are quartzite cliffs, extending nearly up to the. town, (the cañon is about one and a half or two miles long) where the quartzite alternates with chlorite schist. At the mill, in the upper part of the town, is a stratum of fine roofing slate. In the low hill north of the town, about three hundred feet above it, are the croppings of the Gilligan Ledge, which runs northeast and southwest and dips from 60° to 70° to the northwest. This ledge belongs to the

SOCIAL AND STEPTOE MINING COMPANY OF NEW YORK.

This Company was incorporated in September, 1861, formed by the consolidation of the Social Company, owning the Gilligan Ledge and a five-stamp mill, and the Steptoe Company, owning extensions on the Gilligan as well as several other ledges, and a ten-stamp mill, of which the frame is now standing at the lower end of the cañon, while the machinery is stored at Salt Lake City. From 1866 to March, 1868, the five-stamp mill has been running on ore from the Gilligan Ledge, with sufficient profit to pay general expenses, and the developing of the mine.

THE MILL

has five stamps, weighing about six hundred and fifty pounds each, which stamp dry the pulverized ore being carried from the battery to the dust-chamber, which is above, by a fan-blower, thereby saving much dust; three Varney pans and two settlers, which give a capacity of about five tons per twenty-four hours. The motive power is a small eight-inch cylinder, horizontal working steam engine, which works the stamps, pans, and settlers, and blowers (250 revolutions). It is also used to run a small circular saw, with which the company saw all their mining and building timbers, fir and yellow pine, that they cut in the neighboring hills. Wood as fuel, costs at the mill $3.50 gold, per cord.

THE MINE

is opened by three shafts or inclines, the principal is worked by horse-whim. This shaft was originally sunk in the ledge, (which dips from 60° to 75°) and consequently, with a varying inclination, four hundred feet below the surface; but, water coming in at the bottom in large quantities, the lower works were abandoned; the three hundred foot level is now the lowest worked. From this depth up to within some forty feet of the surface, the incline has been enlarged and straightened, new timbers put in, and a ceiling of two-inch stuff throughout the greater part of its extent. This work has been progressing since the stoppage of the mill. Near the surface a body of ore has been stoped out to the northeast of the shaft, which yielded in the mill $18,000, averaging $200 per ton. From this point down to the three hundred foot level, no ore has been taken out, except in sinking, but the vein is said to have maintained the same character throughout. On the three hundred foot level, drifts have been run one hundred and fifty feet southwest, and one hundred and twenty feet northeast. In the former, the vein is very regular, being a broken quartz somewhat decomposed, colored with iron oxide, and showing some sulphurets of silver. It has a width of from four and one-half to six feet, so that the entire drift is in the vein, the hanging wall being remarkably clean and distinct, having a clay gouge of decomposed slate. The foot wall is not so distinct; the country rock seems to be impregnated with quartz and vein matter some distance from the vein. The vein has a small seam or selvage running through the middle, dividing it into two characters or classes of ore. The second or poorer class, which comes on the foot-wall, has hitherto been discarded for want of hoisting power, and used to fill up deserted works, *e. g.*, the incline below the three hundred foot level is mostly filled up with this ore. Mr. O'Dougherty, the superintendent, assures me that the whole vein without assorting will run fifty dollars per ton in the mill; that the richer ore often runs from $100 to $200, and a black clayey ore, which occurs in spots, is still richer. To the northwest the vein maintains the same character, but within some twenty feet of the present face, it pinches to two or three feet wide, the quartz becoming whiter, more compact, and less rich, resuming its former character, however, at the face. Take it altogether, this vein shows a very remarkable regularity throughout. At fifty feet from the face, a stope has been run up some fifteen feet from the floor of the level, nearly to the face of the drift, which has been filled in with second class ore taken from this drift. On the surface to the southwest of the shaft, the vein has been stripped to a distance of five hundred feet, passing a change in the formation from quartzite to chlorite schist. It shows a uniform width of quartz of good appearance throughout, and is said to yield very well in gold towards the extremity. Three hundred feet to the northeast of the main shaft, another shaft has been sunk in a sort of ravine or bend in the slope of the hill, to a depth of one hundred and twenty feet, said to be in good ore, and here about eight feet wide. The quartz in the dump has a whiter, more compact appearance than that taken from the other shaft. It is intended to extend the drift on the three hundred foot level to connect with this shaft, which will then be used as an air shaft.

Eight hundred feet have thus been traced on the ledge. The original location gives the Company 1,600 feet, and extensions (1,600 feet, and eight hundred feet northwest) make their claim 4,000 long. About midway between the two shafts another has been sunk to a depth of seventy-five feet, said to yield good ore. From what I have seen, and from what I am told, by Mr. O'Dougherty, whom I have every reason to believe, the mine seems to be one of great promise, having a very large body of ore in sight, which is easily worked, and yields a fair profit. I should judge they must have some 20,000 tons of ore in sight, estimating the vein to be nearly as uniform above as in the three hundred foot level, say four feet thick and two hundred feet in length. It is the intention of the Company to erect a twenty-stamp wet crushing mill with which they calculate to extract seventy per cent. of the bullion, to treat the ore for twelve dollars, and have an average yield from the whole vein of forty dollars per ton. For this it will be also necessary for them to put up a new shaft-house and steam-hoisting machinery. The ore for the past few months has yielded bullion .937 fine, being gold and silver in the proportion of eighty-six cents gold and one dollar and twenty cents silver to the ounce, the ounce being worth two dollars and six cents.

Mr. O'Dougherty assures me that the mine has paid its way since the commencement through the profit on ore extracted from the shafts, drifts and their few stopes, and reduced in their five-stamp mill. Since the stoppage of their mill, they have been incurring expenses without any corresponding income to the amount of $12,000.

Below the town, two men are running a small arastra by water power furnished by the stream running out of the valley. They are crushing a gold-bearing quartz from a ledge higher up on the hills north of the mouth of the cañon called the Gold Cañon Ledge. It is a clear white quartz, showing occasional specks of native gold. They crush about five hundred pounds per diem, which yields them at present, at the rate of forty to fifty dollars per ton. They have sufficient power to run stamps if they had them. As it is, they break up the ore by hand to the size of a filbert."

NYE COUNTY.

The general appearance of the country through this county is very similar to what it is further north. The valleys and mountains continue in the same order and in about the same direction; perhaps there is more barrenness. This is true especially of the western portion. The plains are almost destitute of vegetation, are very sandy, and interspersed with alkali flats. There are occasional fertile spots, and the usual forest trees are found in many localities on the mountains. Generally water is scarce, and the bunch grass is not so thickly set along the hill-sides. There are no permanent streams or lakes, of any size, and but few marshes. Almost the only supply of water is obtained in springs at the heads of the cañons, or where they rise in the edges of the valleys, as they do occasionally. In the central and eastern portions of the county, the plains are not so extensive, and there are more evidences of fertility in the increased growth of vegetation, and the greater supply of timber, a part of which consists of small groves of white pine scattered at distant intervals over the mountains.

According to the official returns, the popular vote of this county is seven hundred and six.

Belmont, the county seat, is pleasantly situated on a gentle slope of a mountain about one hundred miles south, and perhaps thirty miles east of Austin. It contains about five hundred inhabitants, has a public school and court house, but no church buildings or church organizations.

Ione, formerly the county seat, is on the western slope of the Shoshone Mountains about forty miles southwest from Austin. It has met with sad reverses in the removal of the county seat, and in the suspension of business generally. It may have a hundred inhabitants.

Carrolton, in Hot Creek district, is in a broad cañon on the eastern slope of the mountains, and contains a population of one hundred or one hundred and fifty.

There are other small hamlets, the business centres of different districts.

MAMMOTH DISTRICT.

This district was organized in December, 1863, in the northwest corner of the county. It is principally on the eastern slope of the New Pass Range, ten miles west of Ione. An Indian was the original discoverer, and revealed the locality to some miners. The developments have been made slowly; and yet a great amount of labor has been done, and large sums expended. The district contains a good supply of wood, with grass in abundance, but water is not convenient. Ellsworth is the business centre; it has about fifty inhabitants, four or five families and a post office. The following description of the geological formations and of the character of the mines, is prepared by Capt. Robert Knapp, who has a large experience in mining, and has known the district thoroughly. He says "the adjacent hills are situated to the westward of Ellsworth and are decidedly semicircular in form, whilst immediately to the east, both points of this bow are spanned by a dyke of tufa. Within this inclosure the prevailing bed rock is porphyritic granite, traversed by a considerable number of major and minor lodes. In this basin but few of the salts (chlorides) of silver are found, and those only in the vicinity of the intrusive rocks near the concave range of hills, which consist of trachyte, divided longitudinally by basaltic dykes, and latterly intersected by dykes of greenstone, (chloride schist) copper, associated with some of the salts of silver, appears, and the characteristic colors, green and blue, of carbonate of copper, are seen blending with chloride, bromide, and iodide of silver. This is the result of chemical change and not of mechanical depositions, and should not be regarded as the prevailing character of the ores in this district. * * * I know of but a single instance where chloride of silver occurs at any considerable distance from these intruded rocks, and that is in one of the most easterly lodes, having a western dip. All the other lodes dip to the east, a fact which I think implies the existence of a subjacent anticlinal axis, which would produce such results.

THE MOUNT VERNON COMPANY'S MINES.

"These mines are more extensively developed than any others in the district. operations were commenced by this Company in 1866; a tunnel was run for more than seven hundred feet, opening the ledge. A shaft was sunk to a depth of eighty feet below the tunnel. The tunnel intersected eight lodes, on some of which drifts have been run about four hundred and fifty feet, proving their productiveness, continuity, size and value. At a point near the bottom of the shaft, sixty-six feet below the tunnel, another level has been driven on the Kohinoor lode, and lateral drifts towards other lodes, extend for upwards of two hundred and twenty feet. These explorations sufficiently attest the progressive character of the lodes, containing rock, and afford evidence that each succeeding deeper point reached, an increase both of quantity and quality of the ores will be met with. In operating on the Kohinoor lode at the adit or tunnel, the ores were found largely associated with arsenic and antimony, mixed with bright spots of pyrites of copper, whilst at the lower level, antimoniated silver prevails, of which a fair proportion is of the ruby class. The lode also has increased from about two to upwards of four feet in width. Sulphuret ore prevails in this section, and bears every evidence of permanency.

"This basin contains five or six distinct series of lodes comprising majors with their minors (ledges and spurs) similarly conditioned to those owned by the Mount Vernon Company, each of which would constitute a splendid field for mining enterprise, which, under judicious management, would scarcely fail to become eminently productive. The lodes are of good size, from one to six feet in width, well defined, and yield without exception more or less of sulphuret ores, at every point of development, and constitute what are properly designated true fissure-veins. From this section and beyond the trappean rocks noticed above, for upwards of two miles to the westward, augitic, trachytic and tufaceous lavas, alternate with limestone, dolomitic, and silicious rocks, and thence commence the superincumbent slates. Veins are found in the alternations of limestone and trachyte, which yield ores of a different class from those situated on the east side of the range, being more cupriferous in character and distinguished rather by the salts than by the sulphurets of silver. The ores are more gorgeously colored. The extreme western belt is much more extensive than either of the intermediate ones, and is of the class termed transition limestone. In this belt a number of veins have recently been discovered of miscellaneous metals, comprising gold, silver, galena, zinc, bismuth, antimony, tellurium, etc., some of which are exceedingly rich in the precious metals, and promise an abundant yield when fully developed. From the very superficial depths yet reached, it would be premature to predict which of the classes will predominate in depth, or whether any particular change in the relative proportion of one class to another will take place or not. It is however, to be presumed, that where lodes crop out on a continuous line to such an extent as some of them do, and contain rich ores from one extremity to the other, that quantities of similar classes of ore are treasured up below. The slates already referred to skirt the western boundary of the district, and contain a number of lodes of yet another class of ores. Those which predominate, so far as the eye can discern, are sulphurets of copper, which I have no doubt are argentiferous, and may probably contain gold, but no tests have been made."

In addition to what Captain Knapp has stated above, the following more particular description of mines recently discovered on the western slope of the mountain is subjoined, premising that work has been suspended for some time on all the mines in the eastern part of the district except those superintended by the Captain, for the Mount Vernon Company.

MARBLE FALLS,

Discovered and located by A. J. Hatch, April 25th, 1868. The claim contains one thousand feet; course, northwest and southeast; width of vein-matter, from three to twelve feet; dip, 40° northeast. The ledge is stripped for nearly nine hundred feet; gold largely predominates; silver shows distinctly. The base metals are lead, bismuth, iron and copper. The silver is combined with galena and bismuth; is sometimes native, often in the form of chlorides, occasionally of sulphurets. These results are obtained from assays; the ore has not been reduced. The country rock on both sides of the mine is silicated limestone. The walls seem well defined at the surface. The northeast wall is blended in places with vein-matter. A little distance from the ledge on the northeast side, limestone gives place to chlorite schist, which fills a dyke two or three hundred feet in width. This is succeeded by gneiss.

MARBLE POINT.

This mine has all the characteristics of the Marble Falls, and is on a continuation of the same vein, but not opened so well. Wood and water are abundant in this part of the district.

UNION DISTRICT

Was organized in 1863. It is on the western slope of the Shoshone Mountains, about fifty miles southwest from Austin. Ione is the business center. There is a good supply of wood and water in the vicinity. The geological formations are various. In the vicinity of the Knickerbocker Mill, there are large quantities of hornblende schist, remarkably arborescent; specimens of great beauty are easily obtained. The country rock about the mines is chlorite schist. A little distance north and east of Ione, rhyolite predominates. Croppings of chlorite schist and gneiss also occur in this direction.

INDIANAPOLIS.

There are eight hundred feet claimed; the vein is about fifteen inches wide and crops out on the surface; course, southeast and northwest; dip, 38° notheast. An incline is run on the vein two hundred feet. The vein descends wave-like. At the depth of one hundred and ten feet, a level runs southeast three hundred and twenty feet, and for one hundred and fifty feet, a stope reaches to the surface.

Sixty feet west of the incline of the same level, the vein is stoped out in a triangular section to the surface, along a break caused by a dyke filled with deep red clay, four feet thick, cutting it off. It has not been found west of this break. At a depth of one hundred and seventy feet on the incline, a second level runs southeast. At the bottom of the incline and at every point opened, except at the break, the ledge appears well and is regular, with well defined walls. The richest ore usually lies against the hanging wall, and is about six inches wide. The remainder of the vein is filled with quartz almost barren. The ore is chloride; there is some horn silver; it yields one hundred and twenty dollars per ton. The base metals are iron, copper, galena, antimony and zinc, in quantities to render the reduction difficult.

STORM KING.

One thousand feet claimed; course northwest and southeast; dip 45° northeast; width, from two to three feet on the surface. The mine is opened by two shafts. The west shaft is two hundred feet in depth. At the depth of ninety feet, the first level extends west of the shaft twenty-five feet, and east of it one hundred and ten feet. On the west side, the vein is stoped out to the surface; on the east, only about ten feet above the level. At the depth of one hundred and fifty feet, the second level extends west of the shaft one hundred and fifty feet, and the ore is stoped out sixty feet high to the first level. At the bottom of the shaft the third level runs west forty feet, and the ore is stoped out ten feet above. This level extends east of the shaft ninety feet, and the ore is stoped out thirty feet along the level, and sixty feet in height.

The east shaft has a depth of ninety feet, and is connected with the west shaft through the second level. At the greatest depth the vein is about four feet wide, very regular, and the metal well distributed. The ore yields as high as one hundred and fifty dollars per ton. The base metals are copper and galena, but not in large quantities. There is no water in the mine.

VICTOR.

One thousand feet in the claim. This mine is on the same ledge with the Storm King, and is similar in every respect. It is opened through three inclines. The ore furthest east has a depth of eighty-five feet on the ledge. The first level, at the depth of forty-five feet, extends twenty-five feet on either side the incline. The ore is stoped out to the surface on the east. At the bottom of the shaft a drift runs west thirty-five feet. The ore is stoped out ten feet high. The middle incline has a depth of one hundred and ten feet. The first level, at the depth of fifty feet, runs twenty-five feet on either side the incline. The ore is stoped out to the surface on the east side. The west incline has a depth of forty feet, and a drift from the bottom runs west twenty feet. The ore is stoped out twenty feet above. Wherever opened the ledge retains its width, dip, and value.

STONEWALL.

Located December, 1863; 1,000 feet in the claim; course, east and west; dip, north forty degrees; width, fourteen inches on the surface; depth of shaft, seventy-four feet; extent of incline from the bottom of the shaft, thirty-four feet on the ledge. Fifty feet from the surface the first level runs east on the vein one hundred and thirty feet. The ore is stoped out to the height of thirty-five feet the whole length of this level. At the bottom of the shaft the ledge is cut by a seam and slid a few feet out of place. There is no other peculiarity. The best ore yields one hundred and twenty-five dollars per ton. The base metals are lead, copper, and iron. The quartz is hard and quite clear. The mineral is well distributed through the vein matter. The walls are well defined. No water occurs in the mine.

LAFAYETTE NORTH, ON KEYSTONE HILL.

Located December 4th, 1863. Eight hundred feet in the claim; surface width from three to four feet; dip, sixty-one degrees northeast; course, southeast and northwest; depth of incline, one hundred and sixty-six feet on the ledge; walls well defined; ledge regular and retains its width; ore chiefly chloride, with some horn silver near the surface. Near the bottom of the shaft there are sulphurets and some little native silver.

LAFAYETTE, SOUTH.

Six hundred feet in the claim. On the same ledge as the Lafayette North, and is similar in every respect.

FRANKLIN . NORTH.

Located twelfth of January, 1864; is on the same ledge with the Lafayette South, and similar.

FRANKLIN SOUTH.

Eight hundred feet claimed; joins the Franklin North and is on the same ledge. Is opened from the face of a hill two hundred feet below the surface, with a tunnel one hundred and fifty feet in length on the vein. The second tunnel, sixty feet below the first, runs fifty feet on the ledge. The third tunnel, eighty feet below the second, extends twenty-five feet on the ledge. At each opening the vein appears well. The best ore yields two hundred and nine dollars and thirty-nine cents per ton.

FLORENCE.

Located in January, 1864; 1,000 feet claimed; course, northwest and southeast; dip thirty-five degrees northeast; width of vein on surface, thirty-two inches. A tunnel runs fifty feet on the vein. Ore yields one hundred and ninety-seven dollars and eighty-four cents per ton.

KEYSTONE.

Located November 12th, 1863; 1,200 feet claimed; course, northwest and southeast; dip, northeast fifty degrees; width three feet; incline, sixty feet on the vein; drift from bottom of incline, southeast, sixty feet. From near the bottom of the incline there is a vertical shaft fifty feet in depth, from the bottom of which a tunnnel runs southeast sixty feet on the ledge, which shows a body of good ore.

FLETCHER.

Located January 11th, 1864; 1,400 claimed; course northwest and southeast; dip, northeast seventy degrees; incline, sixty feet in depth on ledge. A tunnel runs from the bottom of the incline southeast on ledge one hundred and fifty feet. The ore is of good quality.

I. X. L.

One thousand feet claimed. Located at the same time and on the same ledge with the Fletcher, and is the same in all its characteristics. It is opened with a tunnel sixty feet in depth.

REVENUE, ON REVENUE HILL.

Located January 12th, 1864; eight hundred feet claimed; course, northwest and southeast; dip, northeast forty-five degrees; width, two feet. A shaft and a tunnel are started. Best ore has yielded three hundred dollars per ton.

ARGYLE.

In close proximity and parallel to the Revenue. Located December 12th, 1863. One thousand feet claimed.

ANDREW JACKSON.

Located in 1864. One thousand feet in the claim. The vein is traceable on the surface. Course east and west; dip 60° north; width on the surface, eight inches. The mine is opened to the depth of ninety-five feet by a shaft. The ledge increases in width to two feet. The metal is well distributed, and the ore is of good quality, promising a fine yield of silver.

KNICKERBOCKER MILL.

Twenty stamps; six roasting furnaces; six Wheelers' pans; three settlers and sixty horse-power engine. It is a mistake to have the furnace in a hill—there is no ventilation—otherwise the mill is well built.

PIONEER MILL.

Ten stamps; four furnaces for roasting; four Wheelers' pans; one settler; capacity sufficient to reduce nine tons in twenty-four hours.

COUNTRY EAST OF IONE.

A few miles east of Ione there are some fertile lands about the head of Reese River. Operations have been suspended in the mines of several districts along the Toiyabe Mountains, and a number of mills are not running. Large sums of money have been expended without satisfactory returns. Many of these expenditures no doubt have been made very injudiciously, and the result is unfortunate to persons interested and to the country.

THE TOIYABE MOUNTAINS.

This range runs due north and south, and is very regular. The spurs and cañons have a direction at right angles with the summit. It is one of the most elevated mountains in the State. It terminates about eighty miles south of Austin. Fine springs and small streams of water flow along the cañons on either side, and originally the hills, in many places, were covered with the nut-pine and juniper.

The geological formations are principally granite, limestone, chlorite schist, and red porphyry, very compact.

NORTH TWIN RIVER DISTRICT

Was organized in the summer of 1863, and is about forty-five miles south of Austin, and some twenty-five or thirty miles east of Ione, on the eastern slope of the mountains. The cañons in this neighborhood are very rough and precipitous. Granite, silicious limestone, dolomite and chlorite schist predominate.

BUCKEYE.

This mine is on a ledge cropping out on either side of Summit Cañon, very high on the mountain. Its course is about due north and south. The claim is on the north side of the cañon, and was located in September, 1865. Dip 64° west. The width varies, the vein matter being irregular. The ore seam is from a few inches to four feet in width. An incline follows the ledge north one h dred and five feet, entering the hill about ninety feet below the surface. At the depth of fifty feet a level extends from the incline fifty-five feet on the ledge. From the bottom of the incline another level follows the ledge eighty feet. The mine is drained by a tunnel connecting with the bottom of the incline, two hundred and eighty feet in length. The ore is chloride. Specimens of native silver in sheets and in coils of wire have been found. About the water level, sulphuret ore occurs. The base metals are galena, iron pyrites, traces of copper, zinc and cadmium.

The ore yields as high as $200 per ton. The country rock west is chlorite schist, which alternates with limestone to near the summit of the mountains, where argillaceous slates predominate. The east wall is dolomite, which also alternates with chlorite schist for some distance down the cañon east. The slate finally disappears, and the limestone on the north side of the cañon forms a precipice from eight hundred to a thousand feet in height, and about perpendicular. There is fine supply of wood and water in this cañon.

TWIN RIVER DISTRICT

Was organized in 1863. The mountains are very bald and rugged. The cañons through which the Twin Rivers flow are narrow; the walls are very steep and rough. These streams are beautiful brooks, affording a permanent supply of water for all mining purposes. They run parallel and near to each other, and sink in Smoky Valley. Just above the valley, across the points of the spurs in a northern direction, granite prevails. It forms high precipices, bare of vegetation and of earth. Higher up the cañons chlorite schist abounds, and constitutes the country rock of the mines which have an elevation of 1,800 feet above Smoky Valley, and of 7,000 feet above the sea level. The altitude of the summit a little west of the mine is 9,500 feet.

Ophir, the business center, has a population of about one hundred and fifty persons. There are several families.

THE MURPHY MINE.

This claim was located, in the fall of 1863, on a ledge on the north side of Ophir Cañon. One thousand feet are claimed. The ledge originally cropped out boldly fifteen feet above the surface, and about three hundred feet north and south, and measures twenty-five feet in width. The ore-seam is from one to four feet wide; course, northeast and southwest; dip, 46° southeast The chlorite slate forming the country rock dips west 45°. The adit level on the ledge is three hundred feet in length. From this level an incline follows the ledge to the depth of two hundred and forty feet. The mine is opened and worked by a regular system of levels every sixty feet on either side of this incline. In every section the ore is stoped out and the chambers filled with waste matter, down to the last section or sixty feet above the bottom of the shaft. This work has all been thoroughly done. Three hundred and seventy-five feet north of the incline the ledge is broken by a dyke of chlorite slate, and has not been found further north. In searching for it, a drift is run on its course one hundred feet. A cross-cut also extends northeast the same distance, and another northwest seventy-five feet, in which a vein of barren, decomposed quartz and slate was found. This break in the vein occurs regularly through all the levels. But for this, and a place where it contracts considerably in the adit level, it is in every respect a well formed vein down to the third level. The ore-seam lies next to the hanging wall, which is well defined. At the third level the ore-seam changes to the foot wall, at the north end of the drift, for about one hundred feet south. At the bottom of the incline the vein is split and broken considerably and is not so promising, nor so rich in silver as it was above. The water level was reached at the depth of sixty feet from the surface. The mine is drained by an eight-inch pump.

During the year 1867, the ore averaged $111 per ton, and maintained this average through 1868. The following qualitative analysis of the ore is submitted by Mr. C. B. Vesler, assayer, at the mill:

Fablerz or copper silver glance, (green or blue); ruby silver; silver-bearing galena; zinc blend; copper pyrites; iron pyrites; native silver; arsenical pyrites, and some gold, probably in the iron pyrites.

MILL.

Twenty stamps, each weighing eight hundred and fifty pounds; eight furnaces for roasting; eight Wheeler & Ramsdell's pans; six settlers; engine, one hundred horse-power; double boiler, forty inches in diameter and sixteen feet in length; one rock breaker, (Lake's) No. 15. The mill has capacity to reduce from sixteen to eighteen tons of ore in twenty-four hours by dry process. It is very complete in every respect. An assay office, with necessary shops, is attached. It is thoroughly constructed—employs forty-two men, and consumes eighteen cords of wood in twenty-four hours, which costs nine dollars per cord, consisting of nut-pine, juniper and mahogany. About 10,000 bushels of charcoal are consumed annually, which costs forty-five cents per bushel.

STATISTICS.

Expenditures of the Ophir Silver Mining Company from its organization:

Mill	$183,494 91
Mining and reducing ores to 1866	136,087 44
" " " " " 1867	321,871 51
Hoisting works, 1867	25,495 17
In currency, exchange on money remitted to mine	104,280 14
Expenses in New York to December 31st, 1866	3,541 35
December 31st, 1866, to December 31st, 1867	4,399 72
Total expenditures	$779,170 24

RECEIPTS.

In gold in 1866	$ 81,996 41
" " " 1867	427,227 69
In currency: For sale Treasury Stock	300,000 00
" " For premium on $36,178 54, gold, remitted to New York from the mine	13,696 68
Total receipts	$822,920 78
Total expenditures	779,170 24
Assets over all claims in gold	$ 43,750 54

This is exclusive of real estate, machinery, building, roads, etc.

Amount of bullion made in 1867		$427,227 67
Cost of reducing	$326,971 51	
Cost of Hoisting Works	25,495 17	
		352,466 68
Total Profits		$ 74,760 99

The accounts for 1868 were not made up in time for this report.

There are several other mines in this district, but work is suspended for the present.

SALT MARSH.

Northeast from Ophir a few miles, there is a salt marsh, where large quantities of salt are obtained annually. It is of good quality and produced by evaportion.

COUNTRY SOUTH OF TWIN RIVER DISTRICT.

South of Twin River, in the valley near the foot-hills, about seven or eight miles, there are several hot springs—none of them very large, but several are boiling continually, and emit quantities of gas and heated air. The deposit of silicious matter covers several acres.

A strip of fertile land well supplied with water from springs on the east side of the mountain, winds along the center of the valley for five or six miles. There are a number of fine hay ranches, and wheat, barley and various kinds of vegetables are cultivated with success. The soil is a dark loam and would be remarkably fertile were it not for the alkali, which renders considerable tracts of it almost barren. Bunch-grass grows luxuriantly on the mountains on either side of Smoky Valley, extending sometimes far down below the foot-hills. Small quantities of nut pine, juniper and mahogany grow about the heads of the cañons and in places along the sides of the higher spurs.

SAN ANTONIO MOUNTAINS.

South of the Toiyabe Range fifteen or eighteen miles, the plain which near that point is about twenty miles wide, is divided by the San Antonio Mountains. This is a short, broad cluster of hills, rather than a range, entirely surrounded by sandy valleys. A small stream, called Pea-vine, issues from the southern spurs of the Toiyabe Mountains, runs south and west about six or eight miles and sinks. East of the sink two or three miles there is a small strip of wet land and several springs, which are known as Indian Springs. Here the Rigby Silver Mining Company's Mill is situated. It is intended only as a prospecting mill, and has four stamps, a furnace for roasting, two pans and a settler. It reduces two tons in twenty-four hours. The pans are constructed with granite bottoms, and the experiment gives satisfaction. Wood is brought eight miles, and costs ten dollars per cord. This mill is eighty-five miles due south of Austin, and twelve miles north of the San Antonio mines.

SAN ANTONIO DISTRICT

Was organized November 1st, 1863. Its boundaries are very indefinite. The mountains are almost entirely destitute of wood and water. The low hills and parts of the adjoining valleys are covered with sand-grass of the finest quality for many miles. From seventy-five to a hundred tons of it were cut for hay by Indians employed for the purpose.

Quartzite, porphyry and chlorite schist predominate, and compose the country rock in the neighborhood of the mines on the west side of the mountains.

LIBERTY,—ON LIBERTY HILL.

This claim was located in the fall of 1863, and contains fourteen hundred feet on the ledge, which runs northwest and southeast; it dips 35°, changing to 48° northeast. The vein matter shows on the surface from twenty to more than sixty feet in width. Pockets of every form, size and value occur. The walls are very irregular often having a warped appearance.

The country rock is a hard, compact dark red porphyry. At the depth of two hundred and seventy feet, the vein matter contracts very much. At the depth of three hundred feet, it widens again to about thirty feet, and is nearly horizontal.

This depth is reached through an incline, which follows the direction of the ore seam. A great amount of stoping is done. From the foot of the incline there is a drift north two hundred feet without finding a great quantity of ore. Another drift from the same point east, reached a body of quartz which extended vertically nearly thirty feet. The best ore has yielded one hundred and fifty dollars per ton. The base metals are antimony in large quantities, some copper, arsenic and lead. The greater part of the ore is chloride; horn silver has been found. There are considerable quantities of sulphurets. The first year after this mine was opened, it yielded $62,648.26 in bullion, .716 fine.

POTOMAC—ON POTOMAC HILL.

This mine is about four miles north of the Liberty; has 1,200 feet in the claim, and was located November 20th, 1863. The vein is about two feet wide, and dips northwest 45°; course northeast and southwest. The country rock is porphry, dipping with the ledge, is much broken, and where it crops on the crest of the hill is vertical. A tunnel from the face of the hill west, runs northeast three hundred feet without intersecting the vein. Chlorides and sulphurets of silver, with copper glance and brittle antimonial silver, have been found. No tests of the value of the ore have been made.

LONE MOUNTAIN.

South of San Antonio two or three miles, there is a succession of sand-hills, from fifty to two hundred feet high, and covering a large area. Six or eight miles furthur south on the plain, there is an agate bed extending east and west about a mile; many of these are very beautiful moss agates. Four or five miles southeast of this point, Lone Mountain is situated. It is a high, isolated hill, surrounded entirely by a sandy plain, destitute of water. Mines were discovered here in the spring of 1866, and a district organized, called

LONE MOUNTAIN DISTRICT.

Very little work has been done on account of the threatening attitude of the Indians. In the mountain there is a fine spring of good water, surrounded with grass and a few scattering nut-pines; otherwise the whole region is very desolate. The mines were discovered and named by Spaniards.

JOSEFA.

Located in March, 1866; 1,800 feet claimed; vein three feet wide; course, north and south; dip vertical. The ledge crops out for 1,000 feet or more; a shaft is sunk to the depth of thirty feet; ore assays four hundred and forty dollars per ton in gold and silver; the quartz is very hard.

ANTONINA.

Located in March, 1866; 1,800 feet on the same ledge with the Josefa, and in every respect similar; the walls are well defined.

SALT MARSH.

Near the base of Lone Mountain, in a south and southwest direction, there is an extensive alkali flat, and a salt marsh further west, which is annually producing large quantities of salt of good quality.

COUNTRY EAST OF SAN ANTONIO.

Eight or ten miles east of Indian Springs, the first range of mountains east of Smoky Valley terminates. The low hills are covered with nut-pine and juniper.

Porphyry, chlorite schist, and mica slate predominate among the rocks. Water is hardly to be found.

RALSTON VALLEY.

This valley is east of these hills, and was the scene of the final sufferings and death of Judge J. H. Ralston, who wandered away from Austin in the winter of 1864, became bewildered, and ended his life alone amid this scene of desolation. A monument of rough stones marks the spot where his remains were found. The valley gradually becomes more elevated in a northeastern direction, until it is intersected by a line of smooth hills passing southeast, and connecting the two higher ranges on either side. In the western part of these hills is the

PHILADELPHIA DISTRICT.

Belmont is the business center. Gneiss is the principal rock on the west of the summit. A dark calcareous slate prevails on the east side of the hills. There is some limestone occasionally with the slate.

The mines in this district were discovered by C. L. Straight and others in July, 1865. In the following October it was organized, and named Philadelphia District. In April, 1866, it was reorganized and called Silver Bend District. In June following the name was changed back to Philadelphia, which name it still bears.

HIBRIDGE.

There are 3,000 feet in the claim. It was located in October, 1865. The vein matter is from five to twenty-five feet wide, usually about fourteen feet. Course, north, slightly west. The ledge cropped out in places six feet above the surface. The average yield of about two hundred tons of the ore taken from the croppings was two hundred dollars per ton.

The first section of the work consists in an excavation of the croppings for about ninety feet on the ledge. The ledge was uniform in width, and regular in its course and dip. The ore, chiefly chloride, contained scales of horn silver, and wires of native silver. A few feet below the surface sulphurets prevail. The base metals are copper, galena and iron.

In the second section of the work, a tunnel is run from the east side of the hill, so as to intersect the ledge at the depth of ninety feet. This tunnel is two hundred and forty feet in length. A level is run on the ledge north and south, an equal distance from the tunnel. The ledge is somewhat broken in places. Dip wavering, nearly vertical; ore rather low grade, rich in spots. The walls are dark calcareous slate, well defined, but varying in course and dip. A shaft is sunk nearly perpendicularly on the ledge, forty feet from the main tunnel. The ledge becomes more regular, increases in width and richness, but for fifteen or twenty feet from the top of the shaft it dips east 60°. The third section of the work shows the water level twenty-four feet above the bottom of the shaft at the termination of the incline. From this point a drift is made eastward two hundred and thirty feet. A shaft is started twenty-seven feet east of the croppings, and sunk one hundred and thirty feet, and it is estimated will intersect the ledge at the depth of seven hundred feet. It passes through slate and limestone. About five hundred feet further north there is another tunnel from the hillside east, running three hundred and thirty-five feet west to intersect the ledge. From the end of the tunnel a shaft is sunk on the ledge sixty-five feet. A level runs north of the shaft thirty-five feet, and south thirty feet; the walls are well defined; the ledge dips 50° east. The ore remains as described in the other works, having the same base metals.

Over the main shaft very complete hoisting works are erected; engine seventy horse-power. The pump has capacity to raise 28,800 gallons of water in twenty-four hours.

ELDORADO SOUTH.

Located in May, 1866, by J. B. Anderson and others; 1,000 feet claimed; course northwest and southeast; cropped out six feet above the surface for the distance of four hundred feet; width varying from eight to ten feet. The dip is northeast 45°. The vein is opened by four inclines following it.

No. 1 (north) has a depth of seventy-five feet. The ledge is very regular, and the metal is well distributed through the vein matter. The quartz is hard and compact. The base metals are lead and iron in small quantities.

Incline No. 2 has a depth of one hundred and thirty-six feet. The ledge and ore continue as in No. 1. The walls are quite regular.

Incline No. 3 runs on the upper part of the ledge near the hanging wall, forty-five feet. A seam is found three feet wide, remarkably rich in chloride ore and increasing in width towards the south.

Incline No. 4 is twenty feet in depth. The ore seam continues, and the vein remains as in No. 3.

The country rock is black slate. The highest grade of ore is found four hundred and fifty feet south from the north end of the claim, near the fourth incline. This ore has yielded five hundred and fifty-seven dollars per ton. Near incline No. 2, an exceedingly rich deposit extends about thirty feet along the ledge. About two hundred tons yielded from three hundred to five hundred dollars per ton. Water has not appeared in the mine.

TRANNSYLVANIA.

Located in April, 1866, eight hundred feet in the claim. Course northwest and southwest. Dip northeast 50°—an incline reached the water level at the depth of one hundred and fifty-five feet. The ledge dips wave-like, sometimes is quite vertical. The best ore yields $300 per ton. A shaft one hundred and eighty-five feet in depth shows fine ore at the bottom. The walls and vein matter are very compact.

MC ALEER.

This claim is on a continuation of the Trannsylvania ledge and has the same character in every important respect. There are one hundred and fifty-two feet in the claim. An incline reaches the water-level at the depth of one hundred and thirty feet.

SILVER BEND.

Two thousand feet claimed; is opened by two inclines, one to the depth of ninety feet and the other to the depth of one hundred and ten feet. They are five hundred feet apart; are connected at the bottom by a level following the ledge, which varies from five to ten feet in width. The walls, ore and country [illegible] e the same as in the Trannsylvania.

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There are several other mines in this district, but work is suspended for the present.

SALT MARSH.

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Belmont is the business center. Gneiss is the principal rock on the west of the summit. A dark calcareous slate prevails on the east side of the hills. There is some limestone occasionally with the slate.

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HIBRIDGE.

There are 3,000 feet in the claim. It was located in October, 1865. The vein matter is from five to twenty-five feet wide, usually about fourteen feet. Course, north, slightly west. The ledge cropped out in places six feet above the surface. The average yield of about two hundred tons of the ore taken from the croppings was two hundred dollars per ton.

The first section of the work consists in an excavation of the croppings for about ninety feet on the ledge. The ledge was uniform in width, and regular in its course and dip. The ore, chiefly chloride, contained scales of horn silver, and wires of native silver. A few feet below the surface sulphurets prevail. The base metals are copper, galena and iron.

In the second section of the work, a tunnel is run from the east side of the hill, so as to intersect the ledge at the depth of ninety feet. This tunnel is two hundred and forty feet in length. A level is run on the ledge north and south, an equal distance from the tunnel. The ledge is somewhat broken in places. Dip wavering, nearly vertical; ore rather low grade, rich in spots. The walls are dark calcareous slate, well defined, but varying in course and dip. A shaft is sunk nearly perpendicularly on the ledge, forty feet from the main tunnel. The ledge becomes more regular, increases in width and richness, but for fifteen or twenty feet from the top of the shaft it dips east 60°. The third section of the work shows the water level twenty-four feet above the bottom of the shaft at the termination of the incline. From this point a drift is made eastward two hundred and thirty feet. A shaft is started twenty-seven feet east of the croppings, and sunk one hundred and thirty feet, and it is estimated will intersect the ledge at the

WESTPORT.

Located in November, 1866. One thousand feet in the claim. Vein matter ten feet wide. Course northeast and southwest. Dip 45° southeast. The east wall is black clay—and the country rock, slate. On the west the slate continues for two hundred or three hundred feet, and then gives place to granite. The incline on the ledge is down fifty feet. A tunnel is commenced from the hillside, which is expected to intersect the ledge at the depth of one hundred and fifty feet from the surface. The best quality of ore will probably yield $100 per ton.

ONTARIO.

Located in the year 1867. Twelve hundred feet claimed, on a ledge parallel with the Westport—about three hundred feet east of it. It is not sufficiently opened to estimate its width and dip with certainty. The surface ore looks well.

COMBINATION MILL, AT EAST BELMONT.

Forty stamps—twenty for wet crushing and twenty for dry crushing. Eighteen tons are reduced by dry process, in twenty-four hours. There are thirty-two Wheeler pans, sixteen settlers, ten furnaces for roasting, two engines—(one Corliss, one hundred and twenty horse-power) one slide valve, eighty horse-power—and four retorts. Assay office and shops all complete. Seventy men are required. Twelve cords of juniper wood are consumed under the boilers in twenty-four hours—which costs $3.75 per cord. Under the furnaces eight and a-half cords of nut pine are consumed in twenty-four hours—which costs $5.00 per cord. In smelting and assaying two hundred and seventy-five bushels of charcoal are consumed in twenty-four hours, at a cost of thirty-two cents per bushel. For retorting from twelve to fifteen cords of nut pine are consumed per month. Salt is used in proportion to the richness of the ore; about two tons are consumed in twenty-four hours—cost $60 per ton. The transportation of the ore from the mine costs $1.00 per ton.

A tramway could easily be constructed from the hoisting works to the mill, and the ore be taken in cars. Above the mill on the hillside, there is a permanent spring discharging about twelve inches of good water.

Four miles north of the mines, there is a wide cañon with a beautiful stream containing about one hundred inches of water permanently. There is also in this cañon about fifty acres of good native meadow, and a hundred acres of fair agricultural lands.

NORTHUMBERLAND DISTRICT

Is near the line between Nye and Lander counties, north of Belmont. Very little work is being done, except in one mine, and the developments made, though encouraging, have not resulted in any valuable discoveries.

HOT CREEK DISTRICT.

This district was organized on the 12th of February, 1866, and is on the eastern slope of the second range of mountains east of Belmont. On the west side rhyolite prevails. Granite appears in places, limestone caps the summit and eastern slope for several miles north and south. It is very distinctly stratified, and in places very much broken.

The bunch grass is abundant, and there is a good supply of wood in places. Water is found in the cañons. A number of springs rise near the mines; several of which are warm. The heated water flows from them for some distance eastward and sinks on the plain. This gave rise to the name Hot Creek.

QUINTARA.

One thousand feet claimed. Course southwest and northeast. Dip 25° southeast, width of vein matter from two to twelve feet. Incline has a depth of sixty feet. The ore is of good quality. The ledge and walls are much broken.

ACHILLES.

Twelve hundred feet in the claim. Dip 40° east. Course north and south, surface width five inches. At the depth of ninety-six feet at the bottom of the incline it is two feet in width. The ore yields as high as one hundred and thirty dollars per ton.

ARIZONA.

Reported by Mr. J. M. Robertson. "An incline has been sunk seventy-five feet and at this depth the lode is five feet wide, and holding the precious metal in a gangue of silicates in the forms of sulphide, bromide, chlorides and sulphates of silver, with bromide and oxide of lead and copper as a carbonate and sulphide. The dip of the lode is east 65° to a depth of twenty-two feet. From this point to the bottom of the incline the dip is 44° east. The foot-wall to the depth of thirty feet is trachyte and argillaceous alumina, but from this point to the bottom of the incline the wall is argillaceous clay, talcose slate, very smooth and soapy, with an argillaceous odor. The upper or hanging wall is granite and trachyte and considerably disintegrated and distorted to the depth of twenty-five feet; but from this point down the hanging wall is compact and smooth. The course of the vein is due north and south. The small feeder or rake vein about twenty feet west of the Arizona having a dip of 40° east will intersect it within about twenty-five feet, and the silver circle (another rake vein) one hundred and sixty feet west, will intersect the Arizona at about four hundred feet, it having a dip of 24° east. The country rock is basalt, granite, serpentine, porphyry and slate, intermixed with quartz, and silicates of calcium and alumina—also carbonate and sulphate of calcium. The ore will assay on an average $150 per ton. Some specimens have assayed as high as $500 per ton."

SPANISH BELT.

This is a part of Philadelphia District, seven or eight miles west of Belmont, on the eastern slope of the main mountain. Wood and water are abundant in this vicinity.

PENNSYLVANIA.

Located January 7th, 1867. Thirty-three hundred feet claimed. Course east and west. Dip 60° south. Wall and country rock on the south, micaceous slate—on the north, granite. Both walls are well-defined. The width of the vein is ten feet. Depth of shaft on the ledge sixty-five feet. A tunnel two hundred and forty-eight feet in length runs north from the face of the hill south, and it is estimated will intersect the vein within fifty feet at a depth of one hundred and fifty feet below the surface. The ore shows sulphurets of silver, assaying from $40 to $1,200 per ton, free from base metals.

EMPIRE.

Located in January, 1868. Fourteen hundred feet in the claim. Course north and south. Dips slightly east, nearly vertical. Width four feet; shaft sixty-five feet in depth; vein regular. It is stripped on the surface for sixty feet. The ore contains both chlorides and sulphurets.

WESTPORT.

Located in November, 1866. One thousand feet in the claim. Vein matter ten feet wide. Course northeast and southwest. Dip 45° southeast. The east wall is black clay—and the country rock, slate. On the west the slate continues for two hundred or three hundred feet, and then gives place to granite. The incline on the ledge is down fifty feet. A tunnel is commenced from the hillside, which is expected to intersect the ledge at the depth of one hundred and fifty feet from the surface. The best quality of ore will probably yield $100 per ton.

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Located in the year 1867. Twelve hundred feet claimed, on a ledge parallel with the Westport—about three hundred feet east of it. It is not sufficiently opened to estimate its width and dip with certainty. The surface ore looks well.

COMBINATION MILL, AT EAST BELMONT.

Forty stamps—twenty for wet crushing and twenty for dry crushing. Eighteen tons are reduced by dry process, in twenty-four hours. There are thirty-two Wheeler pans, sixteen settlers, ten furnaces for roasting, two engines—(one Corliss, one hundred and twenty horse-power) one slide valve, eighty horse-power—and four retorts. Assay office and shops all complete. Seventy men are required. Twelve cords of juniper wood are consumed under the boilers in twenty-four hours—which costs $3.75 per cord. Under the furnaces eight and a-half cords of nut pine are consumed in twenty-four hours—which costs $5.00 per cord. In smelting and assaying two hundred and seventy-five bushels of charcoal are consumed in twenty-four hours, at a cost of thirty-two cents per bushel. For retorting from twelve to fifteen cords of nut pine are consumed per month. Salt is used in proportion to the richness of the ore; about two tons are consumed in twenty-four hours—cost $60 per ton. The transportation of the ore from the mine costs $1.00 per ton.

A tramway could easily be constructed from the hoisting works to the mill, and the ore be taken in cars. Above the mill on the hillside, there is a permanent spring discharging about twelve inches of good water.

Four miles north of the mines, there is a wide cañon with a beautiful stream containing about one hundred inches of water permanently. There is also in this cañon about fifty acres of good native meadow, and a hundred acres of fair agricultural lands.

NORTHUMBERLAND DISTRICT

Is near the line between Nye and Lander counties, north of Belmont. Very little work is being done, except in one mine, and the developments made, though encouraging, have not resulted in any valuable discoveries.

HOT CREEK DISTRICT.

This district was organized on the 12th of February, 1866, and is on the eastern slope of the second range of mountains east of Belmont. On the west side rhyolite prevails. Granite appears in places, limestone caps the summit and eastern slope for several miles north and south. It is very distinctly stratified, and in places very much broken.

The bunch grass is abundant, and there is a good supply of wood in places. Water is found in the cañons. A number of springs rise near the mines; several of which are warm. The heated water flows from them for some distance eastward and sinks on the plain. This gave rise to the name Hot Creek.

Carrolton is the business centre. An Indian discovered the mine in the fall of 1865—and conducted some miners to the place about the first of the following February. He was rewarded for his labor by having one of the principal mines named in honor of him.

The rich ore in this district generally, is found in seams and pockets in the vein matter. Large bodies have not frequently been discovered.

INDIAN JIM.

Located April 3d, 1866. Fifteen hundred feet claimed. Course, north and south. Dip 60° east. A shaft sixty feet in depth reveals the character of the ledge which, with the country rock, is very much broken. The ore is chloride with some sulphurets, and the best quality yields $200 per ton. It is found chiefly in pockets. The walls are tolerably well-defined. The country rock is limestone.

MERRIMAC.

This is the northern extension of the Indian Jim, and is similar in all respects. Fifteen hundred feet are claimed.

CAMANCHE—*Old Dominion Cañon.*

The following description of the ledge and mine, submitted by request, is from Mr. J. M. Robinson: "I find the location covers twelve hundred feet of ground. The strata is north and south, with a dip of about 50° to the west. The ledge conforms with the stratification, and shows a well-defined lode of two feet in width, with well-defined walls of vitrified limestone and porphyritic trap. The ores are of very superior quality, being principally carbonate and sulphide of silver; occasionally chloride of silver and carbonate and sulphate of copper, with a little bioxide of manganese. These ores assay from $75 to $225 per ton of two thousand pounds * * They are free from all rebellious matter. * * * This location like all of the others in this district, presents a stratified mass among the beds of the rocks which constitute these mountains, and the mineral laminæ * * taking the dip of the strata, form beds for themselves, and can be traced over the whole metalliferous district, and lying parallel to each other and forming series from ten to twenty and a hundred feet apart. * * The walls are of very vitrified compound of porphyritic trap and basaltic rock."

RATTLESNAKE CANON

Is about five miles south of Carrolton but in the same district. There is a small spring in this cañon and about twenty-five or thirty miners. Limestone and slate are the prevailing rocks in the vicinity of the mines. As a general fact the ore is in pockets, seams and chimneys. The greatest quantity taken from any one of these deposits is fifteen tons of chloride ore, yielding about $500 per ton.

CHLORIDE AND RATTLESNAKE.

Description by Mr. J. M. Robinson.

"These lodes are situated in Rattlesnake Cañon, about eight miles from Carrolton. The veins are true fissures or dilated; that is, they open between two strata or beds of stone, * * * and lie uniform with the strata in a sloping direction, and nearly on the same inclination, from an angle of a few degrees to the horizon, to a dip of forty-five degrees or more. The vein-stone, or gangue, which accompanies these ores, is calcareous spar, fluor spar, carbonate of lime, and sulphate of barytes. The Rattlesnake claim contains sixteen hundred feet. The vein is twenty inches wide at the surface, with well defined walls and a true fissure vein. The ores are sulphide of silver, carbonate of silver, and carbonate of copper; vein-stone or gangue carbonate of lime, fluor spar and barytes, the wall being the vitrified limestone and marble. * * *

"THE CHLORIDE CLAIM

Contains sixteen hundred feet, and the width of the vein is twelve inches a the surface. This lode, like the Rattlesnake, has been exposed by nature, and has the same stratification, and is parallel to it, cropping out above it some two hundred and fifty feet. It has the same dip and inclination with the strata, and the character of the ores is the same in every respect. * * *

"The ores of these mines assay on an average $125."

MOUNTAIN TOP.

Abridged from Mr. Robinson.

"This mine is situated on the very top of the mountain over Rattlesnake Cañon—one thousand feet are claimed. The vein is ten feet wide. Course, east-northeast by west-southwest, standing vertically at the surface. At the depth of one hundred feet it dips east 70°. The cap rock is vitrified limestone. The ore shows sulphurets of silver, and assays about $150 per ton.

INGOMAR.

Located March 2d, 1868. Twelve hundred feet claimed. Course, north-northeast and south-southwest. Wall on the east, slate; on the west, siliceous limestone. The ore yields about $80 per ton.

BLACK SWAN.

Located July 10th, 1867. Twelve hundred feet claimed—northeast and southwest. Dip nearly perpendicular. The ore is generally chloride, some sulphurets, and yields from $58 to $67 per ton.

SILVER BRIGHT.

Twelve hundred feet claimed. Located April 21st, 1868. Course northeast and southwest. The dip is slightly west; width about twelve feet. The west wall is well defined—country rock, dark clay slate.

NEW PHILADELPHIA.

Located in the fall of 1866. Twelve hundred feet in the claim. Course north and south; width of vein matter, twelve feet; incline down, forty feet. Ore selected yields $100 per ton, and consists of both chlorides and sulphurets.

WYOMING.

Located December 17th, 1866. Twelve hundred feet claimed. Dip southeast, slightly. Course northeast and southwest. The country rock is slate. Shaft has reached the depth of eighty feet. The ore is both chlorides and sulphurets, and yields $204 per ton, closely selected. It is found in a narrow, regular seam, descending to within twenty feet of the bottom, where it becomes irregular and broken. The vein matter is very hard and compact.

HARRISBURG AND NEW YORK SERIES,

Condensed from a Report prepared by Mr. Robinson.

There are two veins parallel, six feet apart, in this location. One is six feet in width, the other is four. The ore is principally carbonate of silver, with a little sulphide and carbonate of copper. Average assay, $150 per ton. The ore is well disseminated through the vein matter.

The New York claim has twelve hundred feet on the same ledges as the Harrisburg, and is in every respect similar.

CONSOLIDATED COMPANIES' MILL

Has ten stamps, three pans, with smelting and retorting furnaces.

OLD DOMINION MILL.

Has ten stamps, four roasters, six wooden pans, and settlers to match.

MOREY DISTRICT

Is about fifteen miles north of Hot Creek, on the eastern slope of the mountain, and was organized in October, 1866. The timber usual in the State is abundant. There is a good supply of water, and the whole region is covered with the finest bunch grass. South of the mines, four or five miles, a peak rises to a great height, and stands out boldly against the valley. It is very rough and precipitous; the rock composing it is a hard compact porphyry. This rock extends through the district in a northwest direction, and composes the country rock of the mines. It is greatly disturbed, and in places is bare of soil. The district was discovered by an exploring party from Austin.

MAGNOLIA.

The ledge crops about two thousand feet east and west, and dips south 50°. It has a width of two and a half feet. Eighteen hundred feet are claimed. There is an incline on the vein sixty feet in length. It varies in width, dip, and richness. Drifts have been run and fifty tons of ore extracted from narrow seams through the vein matter, which yields $225 per ton. The walls are finely defined, but greatly disturbed.

AMERICAN EAGLE.

Located in June, 1866. Fourteen hundred feet claimed. Course east and west. Dip, 50° south. Width of vein matter eight feet. Ore seam is eighteen inches wide, varying to four feet. It also varies in richness. One hundred and fifty tons of ore were closely selected, and yielded $170 per ton. Chlorides prevail, but there are sulphurets of silver.

EUREKA.

Located in June, 1866. Fourteen hundred feet claimed. Course east and west. Width of vein, two feet; dip, 50° south; depth of incline, forty feet. Ten tons of ore extracted; the best quality yields about $100 per ton.

MONATERY.

One thousand feet claimed. Course east and west. The ledge stands vertical; is two and a half feet wide, and is opened by a shaft ten feet. Five tons of ore yielded $50 per ton. The walls are well defined.

MOUNT AIRY.

There are eight hundred feet in the claim. Course east and west; dip south, 60°; width, three feet. Thirty-five tons of the best ore taken out, yielded $72 per ton.

A large number of claims in this district are promising. So little development has been made, however, that any description which might be given would be unsatisfactory.

COUNTRY EAST OF HOT CREEK.

The valley east and a little south of Morey and Hot Creek widens from five or six to twelve or fifteen miles. There are a number of large springs near the eastern side, and some good meadow land, but there is too much alkali to permit profitable cultivation to any great extent. The mountains next east of this valley for forty or fifty miles, north and south, are a low, smooth range, nearly destitute of timber and water, and are almost wholly composed of rhyolite. The summits are frequently capped with basalt. In places the rhyolite presents all its peculiarities of form and color. It holds alkalis and salts in quantities, and as it decomposes by the action of the weather, these minerals are set free and cover the plains below, often rendering large sections entirely barren.

About twenty-five miles southeast from Rattlesnake mines there is a fine natural pass through this range, known as Earnst's Pass. It is so level that the water from the springs in the valley west, in the rainy season, flows through and sinks on an alkali flat in the next valley east. This last mentioned valley leads north to White Pine District. Near the line between Nye and Lander Counties, in the former, Butterfield's salt marsh is situated. It annually produces a considerable quantity of good salt, and might be made to yield a much larger quantity with a small outlay of money. It is within about forty-five miles of White Pine. In the neighborhood of this marsh there are a number of hot springs on the western side of the valley; but there is but little meadow or agricultural land. South of Earnst's Pass, about twenty miles on the eastern slope of the mountain, is

REVEILLE DISTRICT.

An Indian found the mines and led a party of explorers to them. In the summer of 1866 the district was organized. It is situated near where the rhyolite gives place to an extensive limestone formation. Just north of the mines, however, two or three miles, there is a flow of propylite, and in the debris large specimens of obsidian are found. To the westward south, the hills rise much more abruptly, and to a greater elevation, than they do further north. Here, also, there are supplies of wood and grass, but water is very scarce. The ore in this district is found mostly in pockets, seams, and chimneys, and not in large bodies. Deeper shafts may reveal greater quantities.

SUNNY SOUTH.

Located November, 1867. Two thousand two hundred feet in the claim Course north and south. Dip east, slightly. Width of vein matter in places nearly fifty feet. Country rock, limestone (dolomite). The walls are very indistinct. A tunnel from the face of the hill east runs west ninety feet, and is expected to intersect the ledge one hundred feet below the croppings, forty-five feet further. The ore is chloride, and assays from $9 to $450 per ton.

SWEEPSTAKES.

Located in August, 1867. Course, north and south. It stands vertically, width of vein matter fifteen feet, walls very imperfectly defined. The ore is chloride; the best quality selected from small pockets yields from $250 to $800 per ton. An average would yield much less.

SILVER LEAF.

Ore has been extracted in small quantities which yielded from $100 to $400 per ton. But so little development has been made, and the vein matter and country rock are so broken and mingled, that no description can be given with any degree of certainty.

FISHERMAN.

Located in 1866. Two thousand feet claimed. Dip, east 25°. Course, north and south. Depth of incline, eighty feet. The ore from small pockets yields (best quality of chloride) about $400 per ton. Some copper and iron are found.

SANTA FE.

This claim is on a continuation of the same ledge with the Fisherman, and is similar in every particular. Two thousand feet are claimed.

DESERT QUEEN.

Course, north and south. There are one thousand feet in the claim. Dip, slightly west. Depth of incline, sixty feet. There is a good foot wall of limestone. The ore from small pockets and narrow seams is chloride, and yields, closely selected, from $100 to $500 per ton.

WILD ROSE.

Located May, 1867. Sixteen hundred feet in the claim. Dip, east, slightly. Course north and south. Width of vein matter, ten feet. The walls are very imperfectly defined. Ore from pockets yields about $190 per ton.

PARK.

Located May, 1868. One thousand feet claimed. Course, north and south. The dip is west, slightly. Width of pay seam from twenty to twenty-five inches. Selected ore has yielded $848 per ton in small quantities.

RUTLAND MILL.

Situated about fifteen miles southwest of the mines in the next range of mountains west, where water and wood are abundant. It has five stamps, three pans. and settlers to match.

ALUM BED.

In an opening in a cañon in the immediate vicinity of the mines, there is an Alum bed. The rock is apparently a kind of decomposed silicious tufa, and probably for an acre in extent is thoroughly filled with alum. Where exposed it is highly colored, nearly deep red. A small spring of water rises through it, is completely saturated with alum, and sinks at a distance of a hundred or a hundred and fifty yards, where quantities of the pure crystals may be obtained. East of Reveille District the valley is covered in a southern direction with an alkali flat, and is about ten miles wide.

SOUTHERN PART OF WHITE PINE RANGE.

The west range of mountains is the White Pine Range. The Indians call it Shonegodit, grassy mountain, from the fact that it is covered throughout, as far as explored, with the finest varieties of bunch grass. It consists in part of elevated sections, separated by low hills, and passes. The first section, south of White Pine, is in Nye county. Its course is slightly northwest and southeast. The second section changes to about due north and south, and the third lies northeast and southwest. All have about the same geological character, limestone and slates prevailing—the same general altitude and nearly the same outline form. They vary in length from fifteen to thirty or thirty-five miles, but resemble in each being quite densely covered with the usual growth of timber, and also with a limited supply of the white pine. There is a fair quantity of water in the cañons; and small streams often flow down and sink on the plains. The hills between the first and second sections are very low and the pass is broader than that between the second and third; with a much easier grade. All the low hills are bare of timber. There is only a general depression in the range south of the third section; where there is, on the west side of the mountain a change in the geological formation, porphyry cropping out frequently and gradually predominating; the limestone overlaps the summit and finally covers the eastern slope. The direction of the range also changes to about due south, is more uniform, wider and more rugged. Timber is not so general, and is found chiefly on the spurs and about the heads of the cañons.

Quin's Cañon, from ninety to a hundred miles south of White Pine, exhibits the porphyritic rocks very finely on either side. The pass at this point, though not difficult, has in places, a pretty steep grade. South of the cañon there are a number of high peaks in the distance. Upon the whole, this is one of the finest and loftiest ranges in southeastern Nevada.

GRANT DISTRICT.

Organized in December, 1868; is about fifty miles south of White Pine—on the western slope of the second section of the mountain before described. The mines, just discovered in December, are not opened; but the ledges crop out finely, and show a promising class of ore on the surface. The quartz contains copper and iron, as base metals, but assays well in silver.

TROY DISTRICT.

Also just organized. It is south of the Grant, twenty-five or thirty miles, on the western slope of the third section of the mountain above described. The ledges are prominent on the surface, and give indications of great extent. The Blue Eagle claim has attracted attention, as being very promising.

WORTHINGTON MOUNTAINS.

The valley east of Quin's Cañon is a dry sage plain, with an alkali flat to the south, fifteen or twenty miles. The Worthington mountains lie east of this valley. They rise close to the east side of the White Pine range, just south of the Troy district, extend southeast about fifteen miles, and then form a broad barren tableland for a number of miles eastward towards Pahranagat.

WORTHINGTON DISTRICT.

Is on the north extremity and eastern slope of the Worthington mountains. The mines are not worked at present. They are in a limestone formation. The ore contains copper and iron as base metals. There is a small supply of timber and water in the vicinity.

LINCOLN COUNTY.

The southeastern portion of the State, in which this county is situated has some forbidding aspects. The country between Silver Peak in the southeastern corner of Esmeralda county, and the Colorado river, is very desolate. The Amargoza valley is only separated from Death valley in California on the west, and from the Mohave desert on the south, by a chain of low mountains—in places by broken, sandy hills. It is not entirely destitute of vegetation, but it is covered with sand, volcanic ashes, scoria and alkali flats. As the name Amargoza implies, the waters are bitter. Often they contain salt, soda and other minerals, in such quantities that they are nearly red, and are poisonous to animal life. There are no permanent lakes, no living streams and but few springs; and these are found only at long intervals. Grass grows in spots about the springs.

East from the northern end of this valley the mountains are broken into short irregular sections with an occasional peak, or the ore depressed into elevated table-lands, where the Cacti and Yucca tree are almost the only forms of vegetable life. No thorough exploration of this part of the State has been made. East of this, along the Muddy and the upper tributaries of the Rio Virgin, there are a few fertile valleys, not very extensive, but susceptible of cultivation. Corn, wheat, barley, oats and vegetables are produced, and in some of the older Mormon settlements, cotton and the sugar-cane have been attempted. Orchards of apples, peaches, plums and small vineyards are in bearing. South, about the Los Vegas, there are several natural meadows, and the Los Vegas mountains, for sixty miles northwest, are well covered with timber and grass, and occasionally fine springs of pure water are found in the cañons and at the base of the foot-hills. Limestone predominates as far as this range is explored. There are two or three very high peaks and an imperfect pass. In the spurs of this mountain, at the south end, the Mormons formerly obtained large quantities of lead, said to contain a small per centage of silver.

According to the official returns, the popular vote of this county is one hundred and six.

The county seat of Lincoln county is at Hiko, an Indian word signifying white man's city. It is situated in the valley east of the Pahranagat mines, at the head of Muddy river, the largest tributary of the Rio Virgin. The village is regularly laid out on a level plat of ground near several very large springs. It has less than a hundred inhabitants; has a court house, post-office and several stores. There are a number of pleasant families residing here, but there is no public school or church.

Logan City is a village at the south of the mines in a wide pass through the mountain where there is a fine spring of water. It has about the same number of inhabitants as Hiko, and is about ten miles west of it. There is a hamlet in Silver cañon four miles north, and another called Cresent City, at Hetfield's spring, two miles west from Logan City.

Callville on the Colorado, is a small place, where there is a warehouse and shipping facilities.

St. Thomas and *St. Joseph* are two Mormon villages, near the junction of the Muddy and the Rio Virgin. They are situated so closely together that they constitute but one village in truth—and together contain a population of about five hundred.

PAHRANAGAT DISTRICT.

An Indian discovered the mines in this district, and on the 17th of March, 1865, conducted a party of explorers to the place. The district was organized immediately and named Pahranagat in honor of the tribe to which the Indian belonged. The word means "squash-eaters." The territory included is about thirty miles square. Rhyolite and trachitic rocks predominate. They lap upon the points of the low hills, on every side of the mountains in which the mines are located. Next above them, is a dark fossiliferous limestone, which composes the body of the higher spurs, and is found in large masses on the summit.

The direction of this rock seems to be northwest and southeast. Fossil ammonites, tenebratalus and spirifers abound in places, and are found in the vicinity of the mines. Corals and sponges are also occasionally met with. A belt of transition slate, two or three hundred feet in width, divides the limestone about mid-way to the summit on the eastern slope, and partially encircles the mountain at either extremity. The mineral belt runs northeast and southwest, crossing the southern section of Quartz Mountain, and is about five miles in length. The mountain has a course about due north and south, and is probably eight or ten miles long; is quite broken by deep sharp cañons, and has an elevation of about nine thousand feet, being some four thousand feet above the valley. The summit is precipitous on the east side, in places from five to eight hundred feet, and quartz slightly stained with the oxide of iron alternates with the limestone. The ledges crop out along the slope near the foot of the precipice, west and above the belt of slate several hundred feet. There is an abundance of wood. The white pine is quite common near the summit and makes fair lumber. Water rises in large springs along the valley, to the southeast for forty miles, where Pahranagat Lake covers an area of three or four miles in length, and from one to two miles in width. There are ranches all along this strip of moist land; but its fertility is impaired by the presence of alkali.

LIST MINE.

Situated just north of the Hetfield spring. The ledge is opened by three shafts. Two have a depth of seventy feet each, the third has a depth of about two hundred and eight feet. On the surface the ledge crops out between six and seven thousand feet, and is from six to eight feet wide. Dips south 80°. Course east and west. At the bottom of the lowest shaft the ledge is vertical, and a body of ore is found which yields $150 per ton.

The metal is well distributed, and there is every indication of permanency. Above this, the ore occurred in pockets, was very compact, and the highest yield was $110 per ton. The walls are perfectly defined—in many places being finely polished. The country-rock is limestone, very silicious, and dips slightly towards the north.

WEBSTER.

Located July 1st, 1865, by Wm. Barber & Co. Fourteen hundred feet claimed, in a northeasterly direction, and eight hundred feet towards the southwest. Course of the ledge, 15° south of west; dip, 85° southeast. Width of vein matter, twelve feet; of the ore seam, about four and a half feet, which follows the south-east wall. The walls are well defined. A shaft has a depth of one hundred and seventeen feet. At the depth of eighteen feet, the ledge changes its dip to the southeast, leaving the shaft. A drift at the depth of ninety feet intersects the ledge at the distance of eight feet. Another drift from the bottom of the shaft intersects it at twelve feet. The ore at this point appears well. It has not been reduced, but assays from $37 to $350 per ton. It is chloride of silver. The country rock is hard, silicious limestone, with terebratulas fossilized on the surface, within a few feet of the ledge.

GILMAN.

Adjoining the Webster southwest. Located in March, 1868. The claim contains three thousand feet. Course of the ledge 15° south of west. Surface width of vein matter, twenty-four feet; dips, 85° northwest. First tunnel runs from the face of the hill below, seventy-seven feet in a northerly direction. It intersects the ledge fifty-three feet from the mouth, and sixty-five feet below the surface. The vein preserves its width. The ore assays from $77 to $343, per ton. Chlorides and sulphurets occur. Hornblende slates appear in the course of the tunnel, beautifully arborescent. Second tunnel, two hundred and eighty feet perpendicularly below the first, at the bottom of Sanderson Cañon. It is estimated that it will intersect the ledge at a distance of three hundred and thirty feet from the point of beginning. It has reached a distance of one hundred and five feet through slate.

THE ILLINOIS

Crops out above the surface from one to fifteen feet, for more than six hundred feet. Course northeast and southwest. Width from twenty to twenty-two feet; very uniform. Fine specimens of chloride ore appeared frequently. The croppings have been removed for seventy-five feet across the summit of the hill, to the depth of about thirty feet below the surface. The southeast wall is well defined; in places very smooth and polished. The northwest wall is well defined but not so smooth. The ore is chloride of silver, with copper glance and iron. About twenty feet below the surface, a stratum of galena eight inches in thickness appeared, covering the ledge from wall to wall through the whole length of the excavation. With this galena the lead has almost entirely disappeared from the mine. A shaft is sunk from the floor of the excavation, one hundred and seventy feet towards the centre of the hill. At the depth of one hundred and twenty feet, the ledge changes its dip from a vertical to about 75° southeast, leaving the shaft. The walls are well defined at this point, with a yellow clay selvage, from one to four inches in thickness. An air tunnel, one hundred and ninety feet in length, intersects this shaft from the southwest, at a depth of forty-seven feet below the floor of the excavation.

An upper tunnel, from the northeast side of the hill, starts on the ledge at a depth of about two hundred feet below the croppings. It follows the ledge fifteen feet; turns to the west and continues one hundred and thirty-eight feet through the country rock, a very hard silicious limestone. At the distances of thirty-five and eighty-five feet from this tunnel, drifts were made east intersecting the ledge at a few feet. A third drift from the end of the tunnel cut the ledge within fourteen feet. It preserves about the same width and character as exhibited above. The quartz is hard and compact, and assays $95.25 per ton. The walls are lined with yellow clay, four or five inches thick.

The lower tunnel, one hundred feet perpendicularly below the upper tunnel, on the east side of the hill, is three hundred feet in length. It starts on the ledge, and follows it seventy-five feet, where the ledge changes its course slightly towards the west, leaving the direct line of the tunnel for one hundred and sixty-five feet, where it returns to its original direction, and is again cut by the tunnel. The walls are well defined, have clay selvages, and the country rock is hornblende slate, showing arborescent plates. The vein matter is also changed. The quartz is somewhat decomposed, and is easily reduced. The mineral is quite evenly distributed. At a distance of one hundred and seventy-seven feet from the mouth of the tunnel, a drift runs southeast seventy-five feet, nearly at right angles with the ledge, and the drift from near the same point, on the opposite side of the ledge, runs forty feet northwest, also at right angles with the ledge. A third drift starts midway along this drift last mentioned, and runs west for a short distance nearly parallel with the ledge, and then turns gradually northwest eighty-five feet through very hard silicious limestone country rock. These drifts are all dead work. It is not necessary to use timber in this mine, or in fact, in any of the mines in this district. The ore in the lower level shows increased richness. The highest grade would probably yield over $100 per ton. None of the work in this mine has reached the water level in the hill, or extended below the disturbed country rock. Mines of this character usually need opening to a great depth.

CÆSAR.

This mine is not opened sufficiently to permit a correct description. An excavation is made across the ledge about ten feet long and six or seven in depth. The ore seam is only fifteen or twenty inches in width, but is regarded as very rich. Vein matter is apparent to the width of several feet. The walls seem imperfectly defined. The country rock is limestone, showing fossil sponges.

MANCHESTER.

This claim is in the same undeveloped condition as the Cæsar. Its course is southwest and northeast.

INDIANA.

Four thousand two hundred feet claimed, mostly lying on the southern slope of Peter's Hill, on the north side of Silver Cañon. The course of the ledge is 17° east of north. It is difficult to determine the width with accuracy. The vein matter extends twenty feet in width in places. It occasionally crops out eight or ten feet above the surface, and shows a good quality of ore. A tunnel from the south side of the hill, sixty feet west of the ledge, runs in a northwest direction one hundred and ten feet, then gradually turns due north eighty-five feet. From this point there is a drift due east forty-five feet to the ledge, which is penetrated sixty-five feet, all the way through a body of hard disturbed quartz, without reaching the eastern wall. This vein matter exhibits a great diversity of character. It is by turns hard and tough, glassy and brittle, and coated over sometimes with calcareous matter. In places it exhibits strongly the presence of iron, and in other points shows copper stains, or traces of lead, or both. It assays from $7 to $58 per ton in chloride silver. The highest grade ore is found in the greatest quantities near the west side of the river. The ledge dips 75° northwest. From the northwest wall twenty-three feet, along the tunnel a drift runs a little east of north, more than a hundred feet, through an exceedingly hard black quartz. Twenty-eight feet from the tunnel it is intersected by a dyke of dark limestone and clay, ten feet in thickness. A wall there appears, and it well defined to the end of the drift. The quartz is somewhat changed, and at this point is a dark gray color, very hard but brittle and exhibits traces of chloride of silver. Quite recently a seam of fine ore, thirty inches in width, was found. It has been followed fourteen feet, and seems permanent. It has not been reduced, but will probably yield from $60 to $80 per ton. This part of the mine is ventilated by an incline above, running eighty-five feet into the hill, and which is then connected with the tunnel, two hundred and sixty-five feet from its mouth, through a shaft forty feet in depth. At the mouth of the incline about forty tons of good ore were taken out. Nine tons assayed as high as $2,000 per ton.

Further north, on the summit of the hill, a shaft was sunk to the depth of nearly one hundred and thirty feet, known as the Arab shaft. It is in such a position that, at a depth of sixty-nine feet, a drift to the westward penetrated the Indiana ledge at the distance of eighteen feet. This drift was continued forty-five feet further, all the way through quartz, showing copper glance and chlorides of silver. The dip of the ledge at this point is 75° west.

ARAB.

The ledge lies nearly parallel to the Indiana, a short distance east. It may be a spur. Its course is north and south. Four thousand feet are claimed. Width of vein matter from six to fifteen feet. Dip 60° west. The Arab shaft described in connection with the work on Indiana, is intended, also, to develop this mine, if possible, below the disturbed rock.

Peter's Hill, in which these mines are found, shows evidence of deep and extensive disturbance. The country rock is very hard, silicious limestone. Broken masses of it often lie nearly horizontal, and then change to every conceivable angle. No water appears in either of these mines.

MCLEAN, REPTILE, LITTLE GIANT, REYNOLDS, CALIFORNIA BOY, DENVER'S, AND SPRINGER.

These mines are on a series of ledges, cropping out parallel with each other, on the south side of the hill next north of Peter's Hill, and generally having a northeast and southwest course. They vary in width on the surface from one and a half to six feet. They dip northwest at an angle of about 50°. The number of feet claimed varies from twelve hundred to twenty-two hundred feet. On the Springer claim there is an incline eighty feet in depth. About twenty tons of ore are taken out, which will yield between $40 and $50 per ton.

From near the base of the hill, on the southern slope, an incline is run a little west of north, so as to intersect all these ledges, except the Springer, at a depth of near five hundred feet. It extends about two hundred and twenty feet through very hard vitreous limestone, alternating with slates, gray, black, and red. The dip of the country rock is with the ledges; a fine body of ore found at the end of the incline, yields an average of $80 per ton. This series of ledges promises to make a valuable mine.

YELLOW.

Situated at the head of Dedric's Cañon, two miles north of Silver Cañon. The ledge runs in an easterly and westerly direction along the summit of a sharp spur. It crops out on the surface for some distance. Four thousand two hundred feet are claimed. The mine is not sufficiently opened to determine its real character.

MONMOUTH.

This mine is on a spur of the hill east of the Illinois two or three hundred yards. It crops out for some distance, showing vein matter five or six feet in width. There are several small seams of very rich ore cropping out in the immediate neighborhood. One or two are followed to about the depth of twenty-five feet, and increase from one or two inches to eight or ten inches in thickness, and retain their richness. They have well-defined walls, and are regular in every respect. They may be spurs of the Monmouth.

VALLEY MILL

Is situated at Hiko; has ten stamps and five roasting furnaces, eight pans and four separators. This is a fine mill and very complete.

LIST MILL.

This mill is at Crescent City, Hetfield's Spring. It has ten stamps, five pans, four roasting furnaces, and two engines of twenty horse-power each. The construction is such that one engine will drive the stamps, and the other the amalgamating apparatus. They run together or separately, as occasion may demand. The mill has capacity to reduce from eight to ten tons in twenty-four hours. This mill is well constructed.

ST. THOMAS SALT MINE.

This is, in many respects, the most remarkable salt mine in the State. It is a few miles west and a little south of St. Thomas, about two hundred feet or more above the level of the Rio Virgin. Cave Hill, in which the mine is situated, has a general course north and south. It is about three hundred and fifty feet or more in height, partially isolated, and divided about mid-way by a small cañon crossing it to the east. The salt crops out on either side the cañon. It is massive, perfectly crystallized, and so solid that it requires blasting to remove it. A small excavation was found in the hill when it was first discovered, and hence the name Cave Hill. There is a covering of sand and earth over the salt a few feet in depth. The hill is estimated to be from a mile and a half to two miles in length, and about half a mile in width. The salt has been found at different places, and after the covering is removed is always pure. No other salt has been discovered in the neighborhood. The position, the shape and character of this mine, clearly point to a primitive origin. Had it been formed by deposition, it would not have been on the slope of the mountain, nor would it probably have been so pure, so solid, and so perfectly crystallized.

TIMPIUTE MOUNTAIN.

In addition to the mines in Pahranagat District, other ledges have been discovered thirty-five or forty miles southwest, on what is known as the Timpiute Mountain. This is a very high peak, probably the highest in this part of the State. The mines are on the eastern slope, at a great elevation. The threatning attitude of the Indians in this neighborhood and the want of capital among the miners, have prevented any developments or even a thorough exploration.

SHERIDAN DISTRICT.

Organized in April, 1867. It is about twelve miles north of Timpiute Mountain, and fifty miles south of Worthington District. Water and wood are very scarce in the vicinity, and the country is barren. Vein matter crops out prominently for a long distance, from six to ten feet in width. The ore appears in chimneys, and assays from $100 to $300 per ton. Quite a number of claims have been located, but no satisfactory developments have been made.

COLORADO DISTRICT.

This District is situated in the vicinity of El Dorado Cañon, on the Colorado River, in the extreme southern part of the State. It was organized in 1861. The ore shows gold, silver and copper. The value and extent of the mines are undetermined.

CHURCHILL COUNTY.

The position of this county is such that it includes nearly all of the desert area about the sink of Carson and Humboldt Rivers. Along the Carson, in this county, there are tracts of fertile land susceptible of cultivation, but generally the valleys and plains are very sandy, dry, and often strongly alkaline. They are sparsely covered with the sage and greasewood, and in early spring, with a few varieties of hardy plants and flowers. They must, however, continue to be the most barren and desolate portion of the State.

The popular vote of the county, according to the official returns, is one hundred and fifty-one.

Stillwater, the county seat, is situated on the slough between Carson Lake and the sink. It contains about one hundred inhabitants. Large quantities of carbonate of soda are found during the summer in a dry lake-bed near Rag Town.

SAND SPRINGS AND HUMBOLDT SALT BEDS.

At Sand Springs there is a large salt marsh, from which large quantities of salt are collected annually. North of that place sixty or seventy miles, near the county line, at the base of the eastern slope of the Dun Glen Range, is the Humboldt salt bed. It occupies an area of from twelve to fifteen miles in length and about six in width. In the summer, after the water which has fallen in the winter has evaporated, the surface of this bed is covered from two to four inches with a layer of coarse, white salt, which is easily collected with scrapers, and after draining for a few hours is sacked for market. Underneath this is a stratum of hard, rock salt, of unknown depth. It is so compact, that to work it to advantage requires blasting.

SULPHUR AND HOT SPRINGS.

A few miles northwest of the Humboldt salt bed there is a ledge of sulphur cropping out through a fissure in the rock on the eastern slope of the Dun Glen Range. There are also a number of large thermal springs in this vicinity. Some of them are forty, fifty and even eighty feet in diameter, with the temperature varying to 204°.

MOUNTAIN WELLS DISTRICT.

This district is situated in the central portion of the county, south of Jobs Peak—a prominent land-mark in the Dun Glen range. Three or four years ago there was much excitement for a time, about the mines which had been discovered in this vicinity. A large number of claims were located, and many of them sold to Eastern capitalists. The village of La Plata was built and made the county seat. A mill of ten stamps was erected, and large sums of money were expended. But little development, however, was made in the mines, which were not very promising. By degrees, one enterprise after another was abandoned, until all improvements ceased, and now the mill has been torn down and removed to White Pine. The county seat is gone, and La Plata is left desolate. It is surrounded on the south and east with a dreary, sandy plain, destitute of water and almost of vegetable life.

CLAN ALPINE MOUNTAIN,

The next range east, is broad, irregular, and in some places quite elevated. It has some wood, and springs are found at considerable intervals; but the supply of water is not abundant. The rocks are porphyry, rhyolite and limestone.

CLAN ALPINE DISTRICT,

Was organized in January, 1864, in the eastern part of the mountains.

MCGREGOR.

Located, January 10, 1864. One thousand feet are claimed. Width of vein, from sixteen inches to two feet. The dip is 45° west, for about one hundred feet north of the incline, where it changes to 45° east. The incline has a depth of one hundred and eighty feet. At the depth of ninety feet there is a drift extending forty feet on either side of the incline. The ledge has about the same width whereever opened. The ore yields about $12 per ton in silver, and contains traces of gold, iron, lead and antimony. The country rock is porphyry. There are many other claims, but work has been suspended. There is no tillable land in this district. The valley east of it is a barren plain, with a long alkali flat opposite the north part of the district.

NEW PASS DISTRICT

Is situated near New Pass, in the Shoshone mountains, about thirty miles west of Austin. It was organized in the spring of 1864. An Indian exhibited specimens of ore very rich in gold, to some miners, and then conducted them to the place where they were obtained. The ledges are traceable on the surface, and all show free gold. There is a fair supply of wood and water. The hills are generally smooth and quite well covered with grass. The limestone on the west contains a great many fossils very perfect. Chlorite schist is the country rock, in the neighborhood of the mines. Further to the east, rhyolite appears.

SUPERIOR.

Located in the spring of 1864. Fourteen hundred feet are claimed. About twelve hundred feet of this mine are opened in places. The course of the ledge is north and south. Dip, 80° west. The walls are well defined and have a yellow clay selvage. A shaft is sunk one hundred and fifty feet on the ledge near the southern boundary of the claim, where the ledge is vertical and has a width of three feet. At the mouth of this shaft an incline one hundred feet in length follows the vein into the face of a hill, across which the ledge runs. It is remarkably regular, and increases in width to three and a half feet; sixty-five feet perpendicularly above the incline, and further north, up the hill, a tunnel follows the ledge northward forty feet; fifty feet above this tunnel a second tunnel is driven on the ledge one hundred and seventy-five feet. A section of fifty feet in length and thirty in height is stoped out. At the end of the tunnel, within twenty-five feet of the north boundary of the claim, the ledge is broken off smoothly, vertically, and slipped to the westward a few feet. Along the tunnel, one hundred and twenty-five feet from the mouth, there is an incline fifty feet in depth on the ledge, which is unchanged. An air-shaft connects with the tunnel one hundred and fifty feet from its mouth, fifty-six feet below the surface. About half way down this air-shaft, five tons of ore were extracted, but it has not been reduced. It contains free gold, and assays show copper, silver, galena and iron.

GOLDEN BELT SERIES.

Located in the spring of 1864. One thousand feet claimed on each ledge. This belt is about twelve hundred feet west of the Superior mine. The ledges are parallel with it, have the same dip, course and country rock. A tunnel one hundred and eighty feet in length intersects the ledges, being run west from the face of a hill immediately east. Twelve feet west from the mouth of the tunnel a blind ledge was cut, eighteen inches in width. One hundred feet further west, another ledge was cut, two feet in width. Nine feet further a third ledge was cut, twelve inches in width, on which a drift is extended north two hundred feet, and more or less stoping is done for prospecting purposes. In this drift one hundred feet from the tunnel there was foul air, and an air shaft was run to the surface. The ledge varies from eight to twenty-two inches in width. South of the tunnel there is a drift, seventy-five feet on the ledge, which shows no change. From the mouth of the tunnel one hundred and twenty-one feet, there is an incline fifty feet in length eastward, with a grade of 70°. At the bottom of the incline a drift runs north fifty-seven feet, on the principal ledge; forty feet along this drift the ledge is joined by another, and its width is increased from fifteen inches to three feet nine inches. The walls are smooth and the ore is richer than at any other point. Above the line of the main tunnel, running at right angles with it, eleven different ledges crop out on the surface, varying in width from six inches to two feet. They are parallel and are separated from each other from twelve to fifty feet. They stand nearly vertical. The ore has the same character as that from the Superior mine. None of it has been thoroughly tested. It will not yield largely, perhaps not more than from $8 to $15 per ton. A favorable change may occur about the water level, which is not yet reached. There are many other mines located in this district, but they are not opened more than to the depth of about ten or fifteen feet.

NEW PASS VALLEY.

This valley is not productive. It is a sage plain, with an alkali flat commencing eight or ten miles south of the mines and extending twelve or fifteen miles farther south, nearly the entire width of the valley, about seven or eight miles. Towards the north it is terminated within a few miles by low hills uniting the Shoshone with the Reese River mountains.

LYON COUNTY.

The area embraced in this county is very broken and barren. The hills once having a scattered growth of timber are now nearly bare. The valleys are very dry and sandy, and occasionally covered with alkali flats. In places along the Carson River there are narrow strips of fertile land where there are gardens, a few native meadows, and where barley, wheat and corn are cultivated to a limited extent. In an early day there was much excitement about mines in the vicinity of Como. A district was organized and a large number of claims were located. Mills were erected and hundreds of thousands of dollars expended, but no productive mines were opened.

Coal was reported to have been found in El Dorado Cañon, but the discovery proved to be lignite and the mine has not been worked with profit.

Palmyra District has very much the same history as that of Como, and not a great amount of mining is done in the Devil's Gate District, the most prosperous in the county.

For a time the wood trade was an important business, but that has constantly declined as the supply has diminished.

Teaming and milling are now the leading interests. There are about thirty-five mills engaged in reducing ore from the mines on the Comstock Lode.

Dayton is the county seat, and has a church, (Methodist) a public school, a court house, odd fellows' hall, and other public buildings, and about one thousand inhabitants.

Silver City is the business centre of the Devil's Gate District, with a population of above six hundred. It has a public school, odd fellows' hall, and there are a number of fine quartz mills in the vicinity.

According to the official returns, the popular vote of the county is eight hundred and thirty-one.

DOUGLAS COUNTY.

The resources of this county consist principally in its extensive agricultural, grass and timber land. Lapping over the eastern summit of the Sierras, into Lake Valley it has a large supply of almost every variety of wood and timber used for mining purposes. Six or eight saw mills are annually producing large quantities of lumber.

Carson Valley is watered by the Carson River and by a great number of springs, both cold and warm, rising along the base of the foot hills. There are many fine natural meadows and a large number of excellent ranches well cultivated.

Among the products are wheat, barley, oats, corn, rye, and almost every variety of vegetables. A flouring mill has been in successful operation for more than two years, and is manufacturing the finest quality of flour.

Genoa is situated at the base of the Sierras, about twelve miles south of Carson City. It is the county seat and one of the oldest villages in the State. It has a population of about four hundred, a fine brick School house, a Court house, Masonic hall, and several other fine public buildings.

According to the official returns the popular vote of the county is three hundred and seventy-five.

Young orchards are planted and small fruits, currants, gooseberries, raspberries, blackberries, and strawberries, yield abundantly.

The nut-pine range east of Carson Valley affords large quantities of fuel and is supplied with springs and small streams of fine water. Bunch grass is abundant. Cattle, sheep, horses and mules do well and are reared profitably in this county.

In an early day, a few mines were discovered and districts were organized, but operations are suspended for the present.

ESMERALDA COUNTY.

The valleys about the sources and along the lower portion of the Walker River, near the Walker Lake, and isolated spots found occasionally further south and east, constitute the only fertile lands in this county. Some wood and a fair supply of grass and water are found among the mountains, but many of the valleys are very dry and sandy, while large tracts in the eastern portion of the county are covered with alkali flats. The predominating rock near the road over the mountains east of Carson Valley is basalt. On the Walker River, a few miles west of Wellington Station, it is beautifully columnar. The Pine Grove Range on the western slope shows basalt and granite.

Aurora, the county seat, is about one hundred and five miles southeast of Carson City. It has a population of about three hundred and fifty. The Methodists have a church, and there is a public school, a Court house, a bank, Masonic, and Odd Fellows' Hall, and other public buildings.

Pine Grove Village has about three hundred inhabitants and a public school.

The popular vote of the county, according to the official returns, is four hundred and sixty-two; one precinct of fifty-two votes was thown out.

WILSON DISTRICT.

Organized September, 1866. There is a good supply of grass, wood and water. The East Walker River runs within a few miles of the mines.

WHEELER MINE.

Located July 16th, 1866; there are 1,200 feet in the claim; course, 15° west of northwest; the ledge dips northeast 45°. The ore seam varies in width from eight to ten feet. The vein matter is traceable over a wide extent, probably two hundred feet.

Seams of quartz pass through the vein matter at short intervals, showing sulphurets of iron. A tunnel from the face of a hill on the west runs eastward and intersects the vein at a distance of one hundred and six feet. From this tunnel a drift is run southeast one hundred feet and the ore stoped out to the surface one hundred and fifty feet. This is the lowest opening in the mine. A second tunnel, one hundred feet south and one hundred and fifty feet above the first, also from the face of the hill, intersects the vein in about fifty feet. From this tunnel a drift extends on the south side sixty feet, on the north side twenty-five feet. The ore is stoped out to the height of sixty feet. From the north where the hill turns east, a tunnel runs south eighty-four feet, thence southeast thirty feet, thence southwest at right angles ninety-two feet, to a shaft sixty-four feet below the surface of the hill. It is intended to connect this tunnel with the first tunnel described. The ore produces gold principally, and averages a little more than thirty dollars per ton. It contains about two or three dollars per ton in silver. The base metals are copper and sulphurets of iron.

WILSON MINE.

Discovered July 9th, 1866, by William Wilson. It was the first discovery made the district; one thousand feet claimed on the north side of the cañon; course of the ledge, northeast and southwest; the ledge dips northwest 45° ; width of the vein from six to eight feet; the foot wall is well defined; the hanging wall is very irregular and so broken that it can scarcely be called a wall. The ledge has been closely followed, and for eighty-five feet is nearly vertical. From this point it changes rapidly to the southwest, and becomes nearly horizontal. It also contracts, till it finally disappears. The ore exhibits iron much oxidized for fifty feet or more in depth; then it changes to sulphurets. It yields from twelve to forty dollars per ton, and is easily reduced. It produces from fifty to sixty cents per ton in silver. In places, copper has been found pure and malleable. Generally it is about fifty per cent. pure. I other places it almost entirely disappears.

Extensive work has been done in this mine within a short period. The first tunnel, commencing on the face of the hill on the north side of the cañon, is owned by the Wilson and Midas companies jointly, and runs seven hundred feet northwest; thence, due north one hundred and seventy-five feet, intersecting the vein. Two hundred and fifty feet from the mouth this tunnel crosses the ledge. From this point a second tunnel runs northeast on the ledge two hundred and fifty feet; thence it changes southwest one hundred and fifty feet and intersects the first tunnel. The ore is stoped out thirty feet high for two hundred feet along the first tunnel; two hundred feet further southwest, a tunnel is run from the face of the hill thirty-five feet northwest, and intersects the ledge; thence a drift extends northeast one hundred and fifteen feet on the ledge. The ore is stoped out twelve feet wide to the surface. This drift also runs southwest of the tunnel thirty feet. The ledge contracts to two feet in width. A third tunnel five hundred feet in length is run from the face of the hill ninety feet southwest from the second or last described. It intersects the ledge one hundred and fifteen feet from the mouth, where it is about two feet in width. A drift follows it sixty feet southwest, where it becomes barren. A seam is traced upward thirty feet to a chimney from four to ten feet wide, which has continued about one hundred feet, the ore averaging about thirty-five dollars per ton. A drift extends below this chimney, southwest, five hundred feet through vein matter. From the tunnel a drift runs northeast seventy-five feet on the ledge, which varies from two to six feet in width for sixty feet, and then there is only vein matter.

MIDAS MINE.

This is the northeastern extension of the Wilson, and was discovered and located at the same time and by the same parties. It is in every respect similar in its leading characteristics. Commencing two hundred and fifty feet from the mouth of the joint tunnel in the hill, a tunnel runs on the ledge northeast one hundred and fifty feet, where it is broken and irregular. The walls are quite distinct. Seventy-five feet northeast of the joint tunnel another is run one hundred and fifty feet on the ledge. The ore is stoped out to the surface fifty feet along this tunnel. In this part of the mine there is much more work done than is here described. About seven hundred feet northeast of the joint tunnel, and sixty feet below it on the face of the hill, a tunnel two hundred feet long intersects the ledge one hundred and eighty feet from its mouth. At this point the ledge is nine feet wide and the ore good. There is about 4,000 feet of tunneling done in the mine. The country rock is hard, argillous, distinctly stratified, and of a dull white color. It contains dykes of obsidian, and masses of very hard basalt are found occasionally in the tunnels and drifts.

COMPROMISE MINE.

Located in August, 1866; 1,800 feet claimed. The course of the ledge is northeast and southwest; dip, five degrees east; width of vein matter about eight feet. The east wall is quite distinct; the west wall is broken. The ore contains quantities of oxide of iron. A tunnel and an incline have been commenced, but not much work is done.

MILLS.

The Central has five stamps, an amalgamating battery, one Howe's pan, one Wheeler pan, one large settler, and vats for pulp. Engine, twenty horse-power. The mill has capacity to reduce ten tons in twenty-four hours.

THE PIONEER

Has ten stamps, amalgamating battery, and one pan for cleaning up. It has capacity to reduce fifteen tons in twenty-four hours. Arastra, four Howe's pans, run by a donkey engine ten horse-power.

WASHINGTON DISTRICT.

The prevailing rock along the East Walker, for eighteen miles, between Pine Grove and Washington Districts, is basalt. There is scarcely any fertile land. The river flows for miles through a narrow, rough cañon with steep bluffs. The granite appears at a little distance from the mines. The district was organized in 1861. Not much work was done, however, until February, 1867. Some discoveries made at that time awakened a new interest, and the district was reorganized on the twenty-first day of March, 1867.

ECLIPSE.

Located February, 1867; 1,000 feet claimed; width of ledge, four feet. It stands about vertical. Course, northeast and southwest. It is opened for twenty-five feet by an excavation made thirty feet in depth. The ore-seam is from ten inches to four feet in width. Two and a half tons reduced at Capt. Dall's Mill, in Washoe County, yielded two hundred dollars per ton. There are both chlorides and sulphurets of silver, with lead, antimony, and sulphurets of copper. Sixteen tons of ore are on the dump. The vein matter adheres to the walls.

WARSAW.

Located February, 1867; 1,000 feet claimed; ore-seam from four to six inches in width. This mine is an extension of the Eclipse, and the same in every respect. It is but little developed.

SILVER KING.

Located in May, 1867; 1,000 feet claimed. The ore has a stain of copper. It is opened to the depth of twenty feet by a shaft. In all other respects it is similar to the Eclipse. The country rock is coarse granite. The walls have clay selvages.

There are many other claims undeveloped.

THE COUNTRY BETWEEN WASHINGTON AND AURORA.

South from Washington District the country gradually rises for six or eight miles. The granite disappears, basalt succeeds, and then a sedimentary formation prevails. It is very much tilted and often presents the most distinct and perfect stratification. The strata vary from one to twenty or thirty feet in thickness, and stand exposed in the finest positions for study. The country is quite barren, yet there are spots with some bunch grass and a few trees of nut pine. There is no water.

The basalt appears again before reaching Aurora.

ESMERALDA DISTRICT.

Organized in the summer of 1860. So prominent have the mines in this vicinity been for years that but little need be said of their early history. That the surface deposits have in a great measure been exhausted no one acquainted with the facts will doubt.

The mineral belt extends north over the points of three hills, and partly over the fourth. Silver Hill is the most southerly and faces due north. Middle Hill faces northwest, nearly west. Last Chance Hill faces due west, and Martinas Hill south.

They are low, smooth and separated by shallow ravines which unite at their base, and the water which flows from springs above forms a branch of Bodie Creek flowing west into that stream. The mines have an altitude of seventy-seven hundred and forty-three feet.

Aurora is the business centre, and is immediately west of the mines. Wood and water are abundant in the district.

The geological formation consists principally in a hard blue porphyry.

WIDE WEST, ON LAST CHANCE HILL.

There are twenty-seven hundred feet in this claim. Course nearly east, slightly north. Dip varying from 45° to 80° south to the depth of two hundred feet. It then dips 80° for fifty feet where it changes to 40°. The ore was found in pockets, and yielded from $30 to $5,000 per ton. Closely selected, sixty and seventy tons have averaged $5,000 in coarse gold, with but little silver. These rich deposits were between sixty and one hundred feet in depth. Below this point the gold decreases, and the silver increases, until a barren belt of quartz is reached, usually found at the depth of from one hundred to one hundred and fifty feet from the surface.

This barren section underlies all the mines in the district, and as far as has been explored descends in the vein fifty or sixty feet, or more, showing but slight traces of metal.

The quartz is generally very white and hard, and in spots contains a little iron. The best of the rock has produced but $8.00 per ton in silver, the gold having entirely disappeared. On the west end of the claim the barren quartz is very much divided and broken.

The work in this mine has been thoroughly done.

DEL MONTE.

Under this head may be included the mines originally known as the Real Del Monte, Pond, Stonewall, Del Monte, Last Chance, Lexington, Sunbeam, Golden Wedge and Chihuahua.

Beginning at the Wide West they occur on the same ledge in the order named. They exhibit the same characteristics as the Wide West, have yielded about the same proportion of bullion, and are all underlaid with the same belt of barren quartz.

The work has been carefully done.

YELLOW JACKET.

Supposed to be a spur of the Wide West, with which it runs nearly parallel, a little to the south. It is from four to six feet wide and lies very nearly horizontal, nclining south slightly.

The ore was found in chimneys and is taken out to the depth of sixty feet, to the barren quartz.

GOLDEN SPUR.

An extension of the Yellow Jacket, and is similar in all respects. There are a number of other ledges in Last Chance Hill but they are very uniform in all their characteristics. The point of difference is almost wholly in the variations of width.

EMPIRE

Has a width of two feet. It inclines also towards the west end of the Wide West. The barren belt appears as in other mines.

GARIBALDI.

One hundred feet in this claim. It is north of the Empire. There was an exceedingly rich chamber near the surface.

CROCKET.

North of the Garibaldi. This mine was worked through a shaft to the depth of one hundred and thirty feet, and fine ore taken out all the way to the bottom.

A number of rich chimneys were found in stoping.

The claim is worked down to the barren quartz for twelve hundred feet in length.

ETNA.

This mine is about three hundred yards southeast of the Del Monte. It is opened by a shaft to the depth of seventy-five feet. Width, two feet. A broad chimney or sheet of very rich ore was taken out.

OLD DEL MONTE

Is one hundred and fifty yards south of the Etna, and is three feet wide. Near the surface a broad sheet of rich ore was found, which yielded $85.00 per ton. At the usual depth it grew barren, and in places pinched out.

LORD BYRON.

Three hundred yards west of the Old Del Monte. At the depth of one hundred feet it was crossed by a spur from some other mine. About sixty tons of ore obtained at the intersection yielded $500 per ton.

ROBERT EMMET.

Located July, 1866, on Aurora Hill. One thousand feet claimed. Course, north and south. Dip, 85° east. Width, five feet. Ore averages about $15.75 per ton.

NANTUCKET.

Located August, 1866. Twelve hundred feet claimed. Course, southwest and northeast. Width of vein matter, about twenty feet. Dip, 75° northwest. Ore yields $35.00 per ton.

VANDERBILT.

Located in 1866. One thousand feet claimed. Course, north—northeast. Dip, 90° west. Width, from eighteen inches to four feet. Ore yields from $35.00 to $44.00 per ton.

EASTERN SLOPE—ON MIDDLE HILL.

Located in 1861. Eight hundred feet claimed. Course, southeast and northwest. Dips southwest. Width, six feet. Ore yields from $16.00 to $24.00 per ton.

JUNIATA—ON MARTINAS HILL.

Located in 1861. One thousand feet in the claim. Course, northeast and southwest. Dip, 75° southeast. Width of vein matter, about twelve feet. This mine is opened to the depth of two hundred feet, forty feet along the vein, and the ore stoped out fifty feet in height. The barren quartz is laid bare. The ore yielded from $16.00 to $100.00 per ton.

ANTELOPE—ON SILVER HILL.

Course, east and west. Dip, 45° to the depth of fifty feet, where it changes to 85° south. Width, four feet. Ore yields from $50.00 to $100.00 per ton. It is stoped out below eighty feet in depth, to the barren quartz, through the whole length of the claim. A shaft is sunk one hundred and sixty feet in the barren quartz where found water. About twenty feet above the bottom of the shaft, found a thin vein of silver ore, blade-like in form, and which increases to an inch and a half in thickness. It is very rich in chloride silver.

UTAH.

Located in 1860. Sixteen hundred feet in the claim. Course, east and west. Dip, 45° south. Width, two and a half feet, varying to eight feet. Incline run to the depth of two hundred and fourteen feet on the ledge. No water found. Ledge is broken and split. At the depth of about eighty feet the quartz is white and yields but $15.00 per ton. Much of the ore yielded from $50 to $100 per ton.

IOWA.

Seven hundred feet south of the Utah. One thousand feet claimed. The ledge is four feet wide. Dip, 25° south. Course, east and west. The ore yields about the same as the ore of the Utah.

POOR MAN AND WINNEMUCCA.

These mines lie north of the Iowa, and are very similar to it in every respect.

ESMERALDA.

South of the Winnemucca. Course, north and south. Dip, east, slightly. Shaft has a depth of seventy feet. A tunnel from the face of the hill intersects the ledge at the distance of two hundred feet. The vein consisted of hard, barren quartz and was abandoned. Ore from the shaft yielded $300.00 per ton in silver, with a very small per cent. of gold. It was found in a chimney, about two and a half feet wide.

LADY JANE.

Located in 1860. Fourteen hundred feet claimed. Course, east and west, nearly parallel with the Antelope, and similar to it in every respect. There are three inclines; the deepest is one hundred and fifty feet. The ore is found in deposits; three hundred tons yielded from $21.10 to $56.00 per ton.

SUMMARY OF FACTS RESPECTING THE MINES IN ESMERALDA.

From the descriptions given, a few general facts are apparent.

1st. There seems to be a belt of quartz, nearly barren, underlying every mine at about the same depth.

2d. In every instance it is above the water level.

3d. The gold decreases generally from the depth of about one hundred feet, and finally entirely disappears where the barren quartz is found, while the silver increases from the depth of about one hundred feet to the barren quartz. It does not wholly disappear, but the yield is not sufficient to pay for reducing.

4th. The water level is reached in this barren quartz.

5th. At the greatest depth to which this belt has been opened, there was evidence that rich silver might reappear.

Inference. These mines may be worked profitably at greater depths.

MILLS.

Stark & Tucker, in Bodie Gulch, ten stamps, twenty tub pans and settlers to match. Will reduce sixteen tons in twenty-four hours.

DEL MONTE.

Thirty stamps, two crushers, twenty-four Wheeler pans, twelve settlers, one roasting furnace. Capacity to reduce thirty tons in twenty-four hours.

ANTELOPE.

Twenty stamps, twenty Wheeler pans, ten settlers. The Del Monte and the Antelope are very valuable mills.

WINTERS MILL.

Sixteen stamps, eighteen Wakeley's pans, four settlers. Capacity, sixteen tons in twenty-four hours. *A fine mill.*

OLD ANTELOPE—IN ESMERALDA CANON.

Eight stamps, sixteen tub pans. *Not running.*

TELLER MILL.

Eight stamps, two Wheeler pans, a separator and a concentrator.

COFFEE MILL.

Eight stamps, four tub pans. A compact mill, doing good work.

UNION MILL.

Eight stamps, eight tub pans, fifty horse-power engine.

WIDE WEST.

Twenty stamps, twenty Wakeley's pans, two settlers. An attempt was made to bore an artesian well for water for this mill. At the depth of seventy feet a drill was broken in the well, and the work abandoned, after a cost of $10,000.

There are other mills in the neighborhood, but they are not running. Seven have recently been removed to other districts, and one was burned.

SALT IN ESMERALDA COUNTY.

A good article of salt is found a short distance east of Aurora; also, southeast near Fish Lake it is abundant.

RED MOUNTAIN DISTRICT.

It is said that two parties were out exploring in 1864, without a knowledge of each other. One found mines and located a district and called it after a high butte near by, which they named Siver Peak.

The other party also found mines, located a district, and named it after a high butte near by, which they called Red Mountain. Soon after it was ascertained that Silver Peak and Red Mountain were but a few miles apart, and that the two mining districts were near to and essential to each other. Red Mountain District has a good supply of wood and grass, but no water or salt. Silver Peak has water and salt, but neither wood or grass.

WN.

Located in th southeast and northwest; dip 25°

northeast: width, three feet; depth of incline, forty feet. The ore yields from forty to fifty dollars per ton.

CROWNING GLORY.

This mine is situated to all appearances in a mountain of quartz. The ledge runs northeast and southwest, cutting the hill at an acute angle for some distance, and then entering the main trunk of the mountain where it turns eastward. The vein matter crops out about twenty feet in width. It is exposed along the side of the hill for about three hundred feet. The ore yields from twenty to fifty dollars per ton. The quartz is hard and compact, has a reddish color, and contains gold without silver. A small quantity of lead is found as the only base metal. The quantity of ore exposed to sight is very great.

VALLIAN.

The ledge is six feet in width; course, northeast and southwest; dip southeast; ore shows lead and yields twenty-five dollars per ton in gold.

DRINKWATER.

The vein is ten feet wide and parallel with the Vallian on the east, one hundred and fifty feet. The ore yields about twenty dollars to the ton in gold. There is no silver; iron sulphurets abound.

RED MOUNTAIN MILL.

Twenty stamps, six Wheeler pans and settlers. This mill is at a spring a few miles from the mine.

SILVER PEAK DISTRICT.

Discovered and organized in the spring of 1864. No particular reliable information has been obtained about the mines in this locality, except that they are developing finely, and that costly improvements have recently been made. The ore is represented as yielding well, silver predominating. Gold is found in small quantities. The base metals are traces of copper, iron and antimony.

SILVER PEAK SALT MARSH.

Lies immediately east of the mines. The marsh is extensive, and great quantities of salt may be obtained.

ALUM AND SULPHUR.

A few miles north of the Peak there is a vein of these minerals about three feet wide, one half of which is quite pure crystallized alum, and the other half very pure sulphur.

GEOLOGY OF SILVER PEAK.

The principal rock is limestone, a dark blue granite, and croppings of porphyry appear, and in the vicinity there is basalt.

The country is more barren than in the neighborhood of Aurora.

PALMETTO DISTRICT.

About twenty-five miles south and east of Silver Peak, the mines are represented as very promising, and have been developed very much within the last summer.

OTHER DISTRICTS.

There are mines in Paldet, Montgomery, Columbus and Volcano Districts, no important developments have been made, and but little work is being done.